VOLUME 10 • JULY 1952 • NUMBER 3

Journal of ORAL SURGERY

AMERICAN DENTAL ASSOCIATION

CHART YOUR COURSE

TO THE

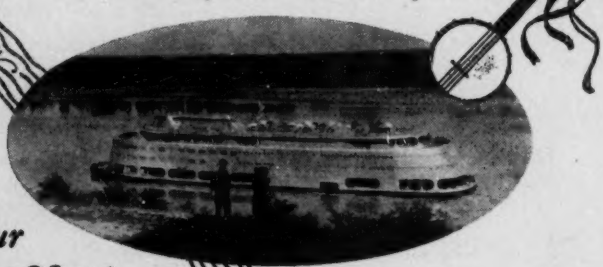
American Dental Association

93rd Annual Session

St. Louis, Mo.

September 8, 9, 10 & 11

A stimulating program awaits you in St. Louis.
Planned for you is everything from table to television clinics, educational and commercial exhibits, scientific essays and an extensive entertainment program. There will be an evening on the Mississippi in the spacious S. S. Admiral—largest and finest of the river steamers. Meet in St. Louis . . . and bring the family for a memorable experience.



Make Your Reservations Now!

(Use Official Forms in A. D. A. Journal)

VOL. 10 • JULY 1952 • NO. 3

A JOURNAL

DEVOTED TO THE ART

AND SCIENCE OF

ORAL SURGERY

JOURNAL OF ORAL SURGERY

Frederick A. Henny, D.D.S., Editor
HENRY FORD HOSPITAL, DETROIT

Journal of Oral Surgery, Vol. 10, No. 3, July, 1952. Published by the American Dental Association, 222 East Superior St., Chicago 11, Ill. Yearly subscription $5.00. Single copy $1.50. Entered as second class matter June 21, 1943, at the post office at Chicago, Ill., under the Act of March 3, 1879. Published quarterly. Copyright 1952 by the American Dental Association. The Journal of Oral Surgery is indexed in Index to Dental Literature and Quarterly Cumulative Index Medicus.

Scientific Articles

USE OF ANTIBIOTICS BY ORAL SURGEON
Stanley A. Lovestedt 187

ROENTGENOLOGIC ASPECTS OF ORAL SURGICAL PROBLEMS
Harrison M. Berry, Jr. 194

ORAL SURGERY IN ATOMIC WARFARE
Russell W. Bunting 204

TREATMENT OF DISLOCATION OF TEMPOROMANDIBULAR JOINTS
J. A. Harpman 205

THIOPENTAL SODIUM
Myron Kaufman 211

CONTROL OF POSTOPERATIVE NAUSEA WITH DIMENHYDRINATE
Alvin L. Armer 225

MYOBLASTOMA OF THE BUCCAL MUCOSA
S. S. Fabe 226

OSTEOPERIOSTEAL FLAP FOR OPERATION OF LARGE TUMORS AND CYSTS
Sanford M. Moose 229

ERYTHEMA NODOSUM OF DENTAL ORIGIN
Adrian L. Almquist 231

RENAL OSTEODYSTROPHY WITH ORAL MANIFESTATIONS
Irwin Lighterman 233

ALVEOLECTOMY
Karl Hayden Wood 239

MUSIC AS AN AID IN ORAL SURGERY
John W. Seybold 246

Case Reports

NEURALGIA INVOLVING THE INFRAORBITAL NERVE
Ralph W. Taylor and Homer S. Samuels 248

CHEMICAL OSTEOMYELITIS OF THE MANDIBLE
Albert David Alexander 250

MONOSTOTIC FIBROUS DYSPLASIA
L. E. Jordan and John F. Drapiewski ... 253

BRONCHOGENIC CARCINOMA WITH PROBABLE METASTASIS TO GINGIVA
Bruno W. Kwapis and Joseph O. Kuebel 255

EDITORIALS 260

QUERIES AND COMMENTS 264

BOOK REVIEWS 265

CURRENT LITERATURE 269

ANNOUNCEMENTS 274

LON W. MORREY

Editor in Chief of Publications—American Dental Association

FREDERICK A. HENNY

Editor—Journal of Oral Surgery

EDITORIAL BOARD

Don H. Bellinger, 1952, Detroit
Herbert J. Bloom, 1954, Detroit
H. Newman Brownson, 1952, Hollywood, Calif.
James R. Cameron, 1953, Philadelphia
Frederick A. Henny, 1955, Detroit
L. M. FitzGerald, 1953, Dubuque, Ia.
G. Thaddeus Gregory, 1952, Indianapolis
Lon W. Morrey, 1953, Chicago

CONSULTING EDITORS

J. Orton Goodsell, Saginaw, Mich.
Robert H. Ivy, Philadelphia
Douglas B. Parker, New York
Carl W. Waldron, Minneapolis
V. H. Kazanjian, Boston

ASSOCIATE EDITORS

Lyle F. Aseltine, Chicago
Joseph L. Bernier, Washington, D. C.
Horace L. Cartee, Miami, Fla.
George W. Christiansen, Detroit
James R. Hayward, Detroit
Reed O. Dingman, Ann Arbor, Mich.
J. H. Johnson, Toronto, Canada
Merritte M. Maxwell, U. S. Naval Academy, Annapolis, Md.
Sanford M. Moose, San Francisco
Ralph G. Peterson, Minneapolis
LeRoy W. Peterson, St. Louis
John J. Stetzer, Jr., Philadelphia
Malcolm W. Carr, New York

FOREIGN ASSOCIATE EDITORS

Juan E. Dillon, Buenos Aires, Argentina
Karl-Erik Hogeman, Stockholm, Sweden
Terrence G. Ward, Sussex, England

VOLUME 10 • JULY 1952 • NUMBER 3 JOURNAL OF ORAL SURGERY

The use of antibiotics by the oral surgeon

■ *Stanley A. Lovestedt, D.D.S., Rochester, Minn.*

Antibiotics are used much oftener than they need be, and, paradoxically, are not used sometimes when they should be. The purpose of this discussion is to encourage the rational and judicious use of antibiotics in conjunction with oral surgery and to discourage the unsound and unwarranted use of antibiotics when no complications are present or impending.

Although hundreds of antibiotic agents are known, only a few are of value in the treatment of diseases of human beings. Those which deserve the greatest consideration at present are penicillin, aureomycin and terramycin, for they are effective against almost all the organisms known to cause trouble for the surgeon who works in the oral field. These antibiotics may be used in an attempt to prevent infection from developing, or for treatment of infection after it develops. They may be used for general systemic purposes, or applied locally in the area of choice. Although several other factors influence the use of antibiotic agents three circumstances are of special importance: (1) identification of the bacteria causing the infection; (2) a knowledge of sensitivity of the bacteria to the various antibiotics and (3) the employment of the proper antibiotic in sufficient dosage and for a proper length of time to prove effective.

The aim of antibiotic therapy is to establish an adequate concentration of the agent at the site of infection and to obtain maximal inhibition of bacterial growth, or death of the bacteria, if such action is possible. Toxic reactions to antibiotics may be a direct result of the amount of the drug used, relationship to dosage, or sensitivity on the part of the host to the antibiotic used.

The early clinical use of penicillin can be recalled vividly—when the product was a relatively crude preparation. Every effort was made before its clinical use, to be certain of the diagnosis and that other measures available as treatment were ineffective. Because of occasional side reac-

Presented before the American Society of Oral Surgeons, Washington, D. C., October 1951.
Section of dentistry, Mayo Clinic, Rochester, Minn.

tions the clinical course of patients receiving preparations of penicillin then available were observed most carefully for indications of response. Lundy and Osterberg[1] reported, in 1945, on the use of penicillin mixed with local anesthetics. Their report made reference to a series of patients and I[2] reported on these patients in 1947. It is interesting to recall the precipitates which occasionally occurred when solutions of penicillin were used as the vehicle for diluting concentrated (20 per cent) solutions of both procaine and piperocaine hydrochloride, for now procaine penicillin is a form of penicillin frequently employed.

As the preparations of penicillin became more and more purified, some of the side reactions no longer developed. Then, as production increased and the drug became more available, troches and lozenges began to appear. Otolaryngologists and dentists used them freely at first, but, as so often happens with empirical treatment, time proved that the generalized and free use of such forms of penicillin have certain broad and definite limitations. One of the most obvious limitations is that a therapeutic blood level cannot be obtained with troches and lozenges; another is that a local allergic reaction frequently forces early discontinuance of such forms of penicillin. The establishment of penicillin-resistant strains of bacteria by such means is a distinct possibility.

■ *Empiric and Rational Use of Antibiotics*

Antibiotics are used in conjunction with oral surgery for either prophylaxis or therapeusis. For either purpose they may be, and are, employed empirically or rationally. Experience with the various antibiotics, and especially with penicillin, when used in an empirical manner prophylactically has been so favorable that there is little if any hesitancy on the part of most oral surgeons to use them in this way. The postoperative course, in the light of experience, can be materially benefited in many instances when such prophylaxis is practiced. The frequency of delayed healing, and occurrence of postoperative reaction and pain are reduced when penicillin is used at the time of, or just prior to, surgery. When such prophylaxis is employed, the surgeon has no idea what he is preventing, but the almost universally favorable response prompts repetition until the procedure becomes routine. In electing to use penicillin in this manner, the oral surgeon assumes the responsibility of toxic reactions and the possible sensitization of the patient to that particular agent. This responsibility is no longer the problem that it originally was, for a patient who is found to be sensitive to penicillin can still be treated with one of the other antibiotics which are now available. In the beginning, however, it was necessary to keep in mind that penicillin might be needed at a subsequent time for treatment of a possible life endangering infection. Spink and Ferris[3] have attributed the appearance of highly resistant strains of staphylococci to the widespread use of antibiotics and have pointed out that drug-resistant micro-

1. Lundy, J. S., and Osterburg, A. E., The Use of an Antibacterial Agent Mixed With a Local Anesthetic. *Proc. Staff Meet., Mayo Clin.* **20**:40 (Feb. 7) 1945.

2. Lovestedt, S. A., Anesthetic-penicillin Solutions for Local Anesthesia in Dental Surgery. *Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.)* **33**:630 (Aug.) 1947.

3. Spink, W. W., and Ferris, Viola, Penicillin-resistant Staphylococci: Mechanisms Involved in the Development of Resistance. *J. Clin. Investigation* **26**:379 (May) 1947.

organisms constitute one of the major problems in the field of antibiotic therapy. The solution, for the present, therefore, is to be sought in the employment of the newer antibiotics, or possibly in the use of combinations of antibiotics.

The routine prophylactic use of antibiotics cannot be advocated arbitrarily if the study which Krogh[4] has reported is considered. A series of 3,127 consecutive dental extractions were carried out in which 1,173 acutely or subacutely infected teeth were removed and for only 12 of the 1,173 was any further treatment needed. Osteomyelitis or septicemia did not develop in any instance. Krogh stated, "I have long been convinced that the best treatment for acute inflammatory processes in and around the teeth is the removal of the nidus of infection (the teeth) followed by treatment of the involved contiguous areas if necessary." It is interesting to observe, at this point, that if some acute dental infections are treated with antibiotics prior to removal of teeth, the infectious process sometimes becomes stationary, so to speak, without localizing and without resolution. Treatment is thus prolonged, and sometimes the drug itself confuses the entire picture.

The use of antibiotics as adjuncts to oral surgical procedures is almost mandatory as a prophylactic measure when the patient has cardiac or renal disease. Another obvious prophylactic usage is in instances in which dental or oral procedures are necessary in the presence of another affliction which in itself would dictate extreme caution during and after any surgical procedure. It is necessary, therefore, for oral surgeons to consult, whenever possible, with internists and other members of the medical and dental professions in order that the patient be better served. With the increase in specialization it is possible for a patient to go from one specialist to another, either by purpose or chance, and receive varied and incongruent treatment from each.

In order to use antibiotics effectively as therapeutic measures a knowledge of the infectious process present is necessary. Some definite steps must be taken to obtain this knowledge. After knowing the history of a given situation, a tentative diagnosis may be entertained, but satisfactory response to treatment follows only when the treatment is directed specifically toward a known condition. This not only implies, but demands, that certain diagnostic facilities be available. The failure to make use of the bacteriologist and his laboratory can be matched only by the indiscriminate use of therapeutic agents developed for specific therapy. Most oral surgeons have access to a hospital which provides a laboratory with a competent staff. It follows, therefore, that making use of laboratories aids in earlier and definite diagnosis, and provides an opportunity for the intelligent treatment of surgical infections.

Robinson and associates[5,6] have made a collective review of the literature concerning bacteremia of dental origin and they emphasize the importance of effective laboratory technic and help in the

4. Krogh, H. W., Extraction of Teeth in the Presence of Acute Infections. *J. Oral Surg.* 9:136 (April) 1951.

5. Robinson, Leonard, and others, Bacteremias of Dental Origin. I. A Review of the Literature. *Oral Surg., Oral Med. & Oral Path.* 3:519 (April) 1950.

6. Robinson, Leonard, and others, Bacteremias of Dental Origin. II. A Study of the Factors Influencing Occurrence and Detection. *Oral Surg., Oral Med. & Oral Path.* 3:923 (July) 1950.

detection of bacteria in the blood stream following oral procedures.

When an organism has been isolated, rational therapy may follow. In an acute fulminating infection the experienced consultant will have a tentative diagnosis in mind, and probably will see fit to begin massive doses of one of the antibiotics which in his experience have proved efficacious under similar conditions. In the event that the particular organism proves to be resistant to the antibiotic being used, the laboratory studies will have given information which will aid in choosing another antibiotic.

Dentists are fortunate in that most of the bacteria which are found in the oral cavity and which prove pathogenic in oral and surgical infections are gram-positive organisms. The streptococci and the staphylococci are the most frequently found organisms either alone, or in mixed infections, and these, for the most part, are sensitive to treatment by penicillin, aureomycin and terramycin. This discussion will be limited to the use of these three particular antibiotic agents.

■ *Penicillin*

Penicillin is the oldest and certainly the most widely used antibiotic agent. Its wide usage stems from its being the first of the practical antibiotic agents introduced, its remarkable effectiveness, its availability, and its relatively low current price. The most important factor favoring the use of penicillin, however, is the relative freedom from untoward reactions.

Several antibiotic substances are classified as penicillin, being designated alphabetically as F, G, K, O and X. Penicillin G is the penicillin most generally used in medicine and surgery. Aqueous solutions of penicillin deteriorate within a day or so at room temperature, and somewhat more slowly under refrigeration. Procaine and penicillin combine to form a compound which is insoluble, thus making possible the use of this combination to provide a depot for prolonged action of the agent following intramuscular injection. Penicillin is not easily absorbed from the gastrointestinal tract, so that it is necessary, when the oral route is used, to provide, in divided doses, about five times the amount of antibiotic given intramuscularly.

There is no standard therapeutic dosage of penicillin, for the reason that there is no standard set of circumstances which require the use of penicillin. Early in the history of penicillin some remarkable results were attributed to aqueous penicillin when as little as 30,000 to 40,000 units were given in divided doses through a period of 24 hours. By contrast, little thought would be given at present to the use of an equal amount, or more, every four hours through the day, in addition to the use of 10 to 20 times the 30,000 units in a procaine base preparation as a depot source of penicillin. It is evident, therefore, that a knowledge of the infectious process is necessary before dosage can be determined.

Regardless of the form of penicillin used, the oral surgeon must be in a position to know which one is indicated, the characteristics of the various preparations, and the indications and limitations of the various forms. An example of this is to be found in procaine penicillin preparations available commercially. It may be popularly supposed that one preparation con-

taining 600,000 units of procaine penicillin per milliliter is twice as effective as another containing 300,000 units. It is interesting in this instance to keep in mind the opinion held by some workers that the first preparation offers a longer depot supply, lasting over a two-day period, but does not provide as high a blood level as the second, which offers a depot supply for a 24-hour period.

All oral surgeons are acquainted with the unfavorable results attending the use of penicillin. Briefly, however, they are sensitivity to the penicillin or the base in which it is carried manifested as an allergic reaction of varying intensity. Sensitivity reactions are said to occur in about 5 per cent of the patients receiving penicillin intramuscularly and 10 per cent of those who receive the agent by mouth. Continued administration of the drug after an allergic reaction develops constitutes a misuse of penicillin. This is especially true now that at least two other agents are available with almost identical bacterial range. Attention should be called to a delayed reaction which is similar to serum sickness and which may occur as long as 10 days after administration of penicillin has been discontinued. Of course, one of the greatest misuses of penicillin is its administration for an infection which is caused by an organism which is not sensitive to penicillin, or which is penicillin resistant. In the latter instance the drug may have been given in inadequate dosage and for an insufficient length of time.

■ *Aureomycin*

Aureomycin is a relatively new antibiotic which has become available recently. One great advantage of aureomycin is that it can be given by mouth; in fact, intramuscular injection is painful and phlebitis often follows its intravenous use. A maximal concentration of approximately 4 micrograms per cubic centimeter of blood serum follows multiple doses of aureomycin, and there appears to be no piling up of the antibiotic in the blood serum. Aureomycin seems to have a wide application in the treatment of infections caused by both gram-negative and gram-positive bacteria. According to Herrell,[7] the recommended oral dose of aureomycin, while not standardized, tends to be more constant than that of penicillin. For infections susceptible to its action it may be given at the rate of 750 mg. (3 capsules) every six hours to adults. For children 500 mg. (2 capsules) every six hours and for very young children 250 mg. (1 capsule) each six hours are recommended. Milk given at the time the capsules are taken will help to prevent nausea. When aureomycin is to be given for more than a week, administration of vitamin supplements should be considered.

When aureomycin is given intravenously, 500 mg. dissolved in 250 to 300 milliliters of saline solution can be given at intervals of 12 hours. This solution can be given in about 15 minutes. At this time it is generally felt that aureomycin should not be given by the intravenous drip method. Sanders and associates[8] gave aureomycin intravenously to 116 patients without noting any toxic effects. They

7. Herrell, W. E., Observations on the Clinical Use of Aureomycin. *Proc. Staff Meet., Mayo Clin.* 24:612 (Dec. 7) 1949.

8. Sanders, Murray, and others, Further Experiences With Intravenous Aureomycin Therapy. A Study of 116 Cases. *J. Clin. Investigation* 28:1006 (Sept. pt. 1) 1949.

reported, however, that phlebitis occurred in 30 to 40 per cent of the patients.

If the cost of aureomycin can be reduced further, it will become a more widely used antibiotic. Regardless of the cost, however, there is one frequently encountered situation in which aureomycin is of paramount importance. That is in instances in which the streptococci or staphylococci causing the disease are resistant to penicillin. In 1944, Spink and associates[9] reported that 12 per cent of 68 strains of staphylococci they examined were resistant to penicillin. In 1946, Barber[9] reported that 14.1 per cent of the strains obtained from patients which she examined, in a single hospital, were resistant to penicillin. In June, 1947, the percentage of patients in this same hospital who had penicillin-resistant strains had increased to 38, and a year later, 1948, the incidence had increased to 59 per cent. In studying the treatment of penicillin-resistant staphylococci bacteremia with aureomycin Nichols and Needham[9] isolated 50 strains of *Micrococcus pyogenes* (*Staphylococcus aureus*) in a period of 44 days ending January 20, 1949. Of the 50 strains of *Micrococcus pyogenes* which were isolated, 34 required more than 1.6 Oxford units of penicillin per cubic milliliter of culture medium to inhibit their growth and were therefore considered to be penicillin resistant. The 34 penicillin-resistant strains were found to be sensitive to as little as 0.78 microgram of aureomycin per cubic milliliter of culture material. Twelve of the 15 strains isolated from patients with bacteremia, were resistant to penicillin. Before the days of antibiotic therapy a patient with staphylococcic bacteremia had approximately one chance in ten of recovering. Needham[10] has isolated additional strains of *Micrococcus pyogenes* since that time and has found little relative change in the number of those resistant to penicillin. Now, however, more than 10 per cent are also resistant to aureomycin.

■ *Terramycin*

Terramycin, which is one of the newer antibiotics, is being intensively studied in clinical application. It is similar in its bacterial range to aureomycin, and in some instances the clinician has either agent at his command. One gram of terramycin by the oral route every six hours appears to maintain levels in the blood serum which should be therapeutically effective. After a single dose of terramycin the concentration in the blood serum begins to diminish at about six hours and almost completely disappears from the serum in 24 hours. The blood serum content of terramycin does not increase significantly with the increase of dosage from 1 to 3 Gm. The level of blood serum which can be obtained by giving multiple doses of approximately 1 Gm. each by mouth every six hours will be between 4 and 8 micrograms of terramycin per cubic milliliter.

Rather large amounts of terramycin are unabsorbed and are excreted in the feces. In the report of preliminary studies Herrell and co-workers[11] stated that the feces became odorless and the clostridia,

9. Nichols, D. R., and Needham, G. M., Aureomycin in the Treatment of Penicillin-resistant Staphylococcic Bacteremia. *Proc. Staff Meet., Mayo Clin.* 24:309 (June 8) 1949.

10. Needham, G. M., Personal communication.

11. Herrell, W. E., and others. Terramycin: Some Pharmacologic and Clinical Observations. *Proc. Staff Meet., Mayo Clin.* 25:183 (April 12) 1950.

streptococci and coliform bacteria disappeared. The only remaining forms may be some resistant yeasts, candida, and micrococci.

Terramycin has been used rather successfully and does not produce untoward reactions except some gastrointestinal irritation evidenced by nausea and occasionally by vomiting. The incidence of nausea and vomiting, however, is less after ingestion of terramycin than aureomycin. Terramycin can be given with milk which does not interfere with its absorption.

Since terramycin does not appear to diffuse well into the cerebrospinal fluid when the level in the blood serum is high enough to be therapeutically effective, one would do well not to depend on this antibiotic alone for treatment of meningitis. Other limitations may come to light as the drug is used further.

■ *Comment*

Too much cannot be said in favor of the rational use of antibiotics, both as prophylactic and therapeutic agents. In case of the former the operator must ask "prophylaxis against what?" and in the latter case, "therapeusis for what?" In prophylaxis the staphylococci and streptococci are the chief consideration, these organisms being especially important when the patient gives a history of rheumatic fever. Geraci[12] states that in 25 per cent of all cases, subacute bacterial endocarditis has followed an extraction of a tooth or of teeth.

In this connection, the number of teeth to be extracted at one sitting should be considered. If antibiotics are to be employed preoperatively and postoperatively, is it better to extract several teeth at one sitting or to incur the necessity of several prophylactic administrations of antibiotic when one tooth is extracted at a sitting?

Infections develop in and around the oral cavity which will not respond to penicillin, aureomycin or terramycin or combinations of these antibiotics. In these cases lies the proof of the need for laboratory study and culture as soon in the course of a disease as possible.

In certain instances dihydrostreptomycin or chloramphenicol, or a combination of drugs may be needed. When acute infections are present, the problem of management is never so simple as the mere administration of an antibiotic drug. Fluid balance, nutrition, and possible surgical intervention must be considered simultaneously if adequate treatment is to be given.

■ *Summary*

The empiric use of the antibiotics probably will increase as the cost decreases and as they are made more generally available. The use of antibiotics as adjuncts in oral surgery has been the rule rather than the exception. Formerly the sulfonamides were given without much consideration of the organisms producing the infectious processes and whether the infections were entirely localized or were systemic in nature. Experience is said to justify the use of chemotherapeutic and antibiotic preparations in particular locations and under certain conditions as adjuncts of dental and oral surgical procedures. It must be admitted, however, that an adequate control series is not

12. Geraci, J. F., Personal communication.

available for proper evaluation of such measures. Since the advent of antibiotics there has been little, if any, change in the nature of the work of oral surgeons. For this reason it might be difficult to explain the wholesale use of antibiotics, especially penicillin, in the course of routine everyday extractions.

Antibiotics are agents which may be used in the treatment of infections which are present or which develop in patients under dental care. The election to use any single agent or any combination of agents is the privilege of all surgeons. It is the oral surgeon's responsibility to use these drugs in the proper manner, for indicated conditions, in amounts which are effective and adequate and for a sufficient length of time to prevent recurrence of infection when administration is discontinued, or the development of a resistant strain of organisms.

Roentgenologic aspects of oral surgical problems

■ *Harrison M. Berry, Jr., D.D.S., Philadelphia*

Roentgenograms, either alone or in conjunction with clinical and laboratory findings, may supply answers to the following questions relating to oral surgery:

1. Is surgery necessary? The roentgenogram may reveal conditions that require surgical procedures, such as residual roots, impacted teeth, cysts and periapical rarefactions (Fig. 1).

2. Where is the surgery to be performed? Proper use of roentgenograms helps to localize the object and the surgical field, thereby aiding one in planning the surgical approach (Fig. 2).

3. How is the surgery to be performed? The roentgenogram may reveal conditions that demand specific surgical technics and special care (Fig. 3).

4. Has the surgery been performed successfully? Postoperative roentgenograms may indicate incomplete removal of a tooth or damage to adjacent structures (Fig. 4).

5. Is proper healing taking place? The necessity of making roentgenograms is obvious; yet, even today too many teeth are being extracted without the aid of roentgenograms. It is important, too, that the proper types, as well as an adequate number, of roentgen ray exposures be made.

Assistant professor of oral roentgenology, School of Dentistry, University of Pennsylvania.

Presented before the Section on Oral Surgery, ninety-second annual session of the American Dental Association, Washington, D. C., October 16, 1951.

A thorough and intelligent study of the roentgenograms must be made in order that the operator may glean every bit of information from them. This, of course, demands skill in the interpretation of the shadows registered, and this, in turn, demands time and careful thought. Roentgenograms do not lie if one has a thorough knowledge of them (and this includes an understanding of their limitations).

To illustrate the above points, two specific problems that might confront the general practitioner will be presented.

■ *Root Curvature*

It is recognized that teeth with widely separated or divergent roots require surgical technics other than routine forceps extraction (Fig. 5). It is also recognized that the extraction of teeth with hypercementosis of the roots (Fig. 6) or teeth with more than the usual number of roots (Fig. 7) present special problems. It is likewise true with respect to teeth having twisted or curved roots (Fig. 8). The roentgenogram will reveal clearly a mesial or distal curvature of the apical portion of

Fig. 1.—Horizontal impaction of a mandibular third molar with a dentigerous cyst causing resorption of the distal root of the second molar, requiring surgical treatment

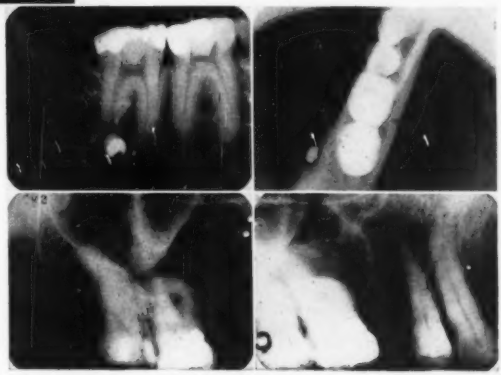


Fig. 2.—"Right angle" technic (periapical and occlusal roentgenograms) for localization. A foreign body (amalgam) lies below the mucosa on the buccal plate. The condition had been present for five years; firm swelling over the area indicated fibrous encapsulation. Some calcification of the fibrous matrix

Fig. 3.—Right angle curvature of the mesiobuccal root of the maxillary first molar. The maxillary sinus shows deep alveolar extension. Careful surgical technic is required to prevent fracture of the floor of the antrum during extraction

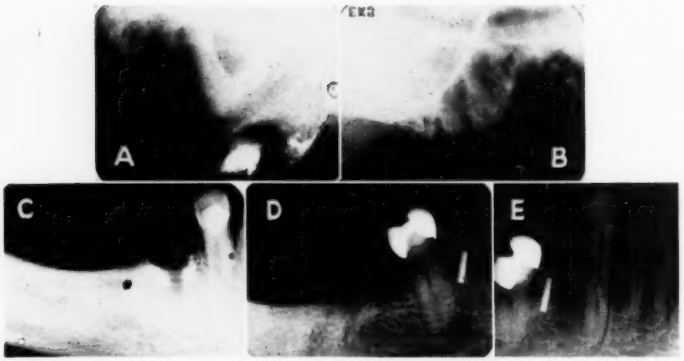


Fig. 4.—A: Residual root associated with area of granulation tissue in the maxillary third molar region. B: Sequestrums in an edentulous maxilla. Biopsy did not show cancer. C: Sequestrum appearing at the crest of the socket of a mandibular bicuspid 36 hours after extraction. It caused severe postoperative pain until it was removed. D and E: Broken fissure bur embedded in bone after extraction of a mandibular bicuspid

a root, and a surgical plan can be formulated to prevent fracture of that root tip. When the apical portion of a root curves to the buccal or lingual side, it will not be nearly as evident in the roentgenogram and can easily be overlooked in a hasty glance. If the curved portion of the root lies in a position parallel with the path of the roentgen rays, it will produce an image on the film with the general appearance of a small radiopaque circle, at or near the apex of the tooth, outlined by a radiolucent line (the periodontal membrane) and often with a radiolucent dot, discernible

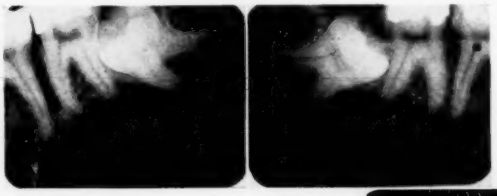


Fig. 5.—Third molars with widely divergent roots, demanding special surgical technics for removal

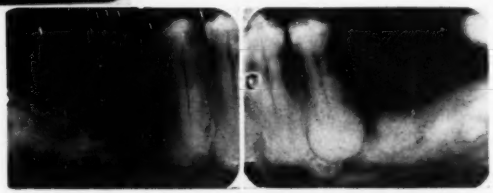


Fig. 6.—Hypercementosis of roots; the root portion is of greater diameter than the opening of the socket

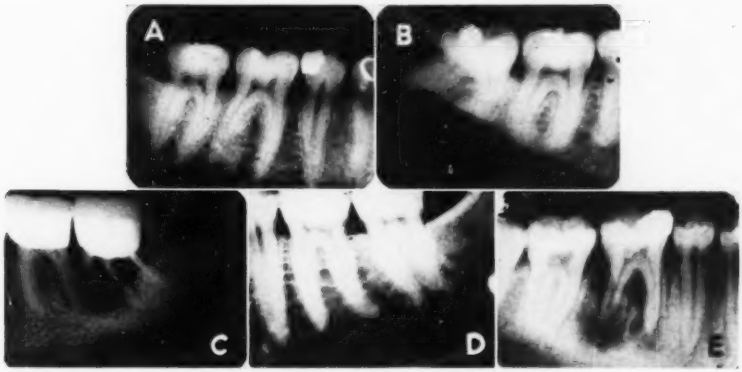


Fig. 7.—A: First molar with two distal roots. B: Second molar with divergent roots and bifurcation at the apical third of the mesial root. C: Three-rooted second molar. The coronal two thirds of the middle root is thinned by resorption. D: Bifurcation of distal root of second molar. E: Three-rooted first molar with diffuse area of rarefaction due to suppuration

Fig. 8.—Root curvatures are obvious in the roentgenograms

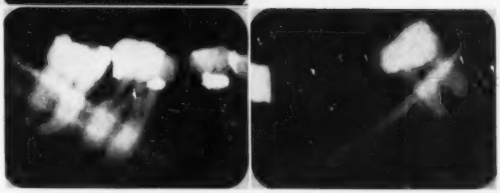


Fig. 9.—Left: The apex of the distal root of the third molar curving buccally or lingually.

Right: Roots of third molar curving buccally or lingually. The curvature is in the same plane as the path of the roentgen rays, producing the image of a small circle with a radiolucent dot inside

at or near its center (the apical foramen) (Fig. 9). Recognition of such root curvature is important, for these fragile root ends can break off and be left behind just as easily as mesial or distal curvatures. Buccal curvature on the distal root apex of a third molar in a dry specimen is shown in Figure 10. (Figure 12, *A*, shows the roentgen image produced in this case.)

Recognition of such a curvature to the buccal or lingual side is of prime importance in formulating a surgical plan of attack; this plan can be further refined by determining specifically whether the curvature is to the lingual or to the buccal. This may be accomplished by two methods, one of which might be called a "visual method" and the other a "geometric method." The visual method is dependent on the fact that an object closer to the film will produce a more distinct image than one farther away from the film. Hence, if the opaque circle at the apex is clear and sharp, the curve would be considered lingual. This deduction rests on a relative degree of sharpness, but, since a root curving in the opposite direction is usually not present for comparison, the final decision in many cases is little better than a guess.

The geometric method, often called Clark's[1] method of localization, is founded on simple but sound geometric principles and is more reliable. In this method two exposures are made. The packet is placed in the same position for both, with the horizontal angle being slightly different for each exposure. The principle may best be analyzed by the diagram in Figure 11. In I, the observer (O), in direct line with telephone poles P_1 and P_2, sees only the closer pole, since it is superimposed over P_2. In II, where the observer moves to the right, P_2, the object farther from him, appears to have moved to the right (of his visual field), while P_1, the object closer to him, appears to have moved in the opposite direction, or to the left of P_2 (the closer object appears to have moved in the opposite direction; also the more distant object moved in the same direction as the

1. Ennis, L. M., *Dental Roentgenology*, ed. 4. Philadelphia: Lea & Febiger, 1949, p. 179-181.

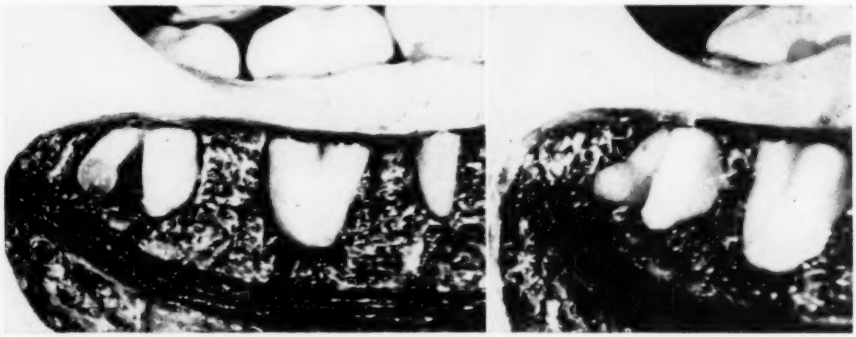


Fig. 10.—Mesiobuccal curvature of the apex of the distal root of the third molar in a specimen

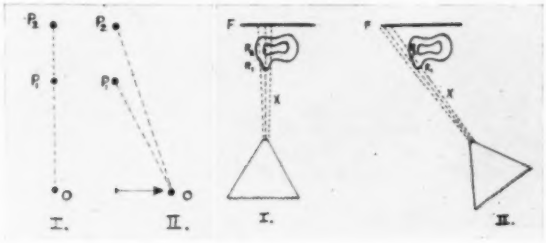


Fig. 11.—Left: Diagram of Clark's method of localization. Right: Diagram of application of Clark's method. In I, the image of the curved portion of the root (R_1) is superimposed over the root (R_2) on the film (F). In II, as the tube is moved mesially, the image of R_1 is thrown away from R_2, R_1 moving in a direction opposite to the tube movement

observer). The same conditions exist if (Fig. 12) an x-ray tube (x) is substituted for the observer (O), the curved portion of a root (R_1) for pole (P_1), and the root (R_2) itself for pole (P_2). A recording medium (film F) must also be placed in back of the field. In exposure I the horizontal angle of the central ray is perpendicular to the film, and R_1 and R_2 are superimposed. With the tube shifted to the right, or anteriorly, and the rays directed at an angle less than 90 degrees to the film, exposure II reveals that R_1 has moved to the left of R_2. There-

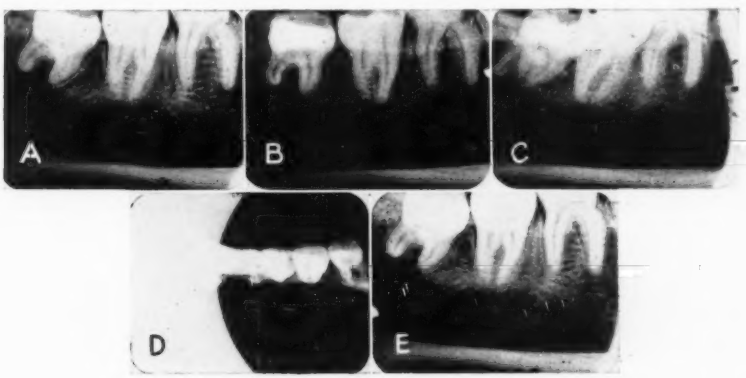


Fig. 12.—A: Roentgenogram of specimen seen in Figure 10. The central ray is directed at a 90 degree angle. B: The tube is moved posteriorly, and the distal root tip of the third molar curves slightly anteriorly with respect to the upper portion of the root. The curved tip moved in the direction opposite to the tube, and therefore extends buccally. C: The tube is moved anteriorly and the distal root tip moves posteriorly, again confirming buccal projection of the root tip. D and E: "Right angle" technic on the same specimen. The ascending ramus prevents placement of the film farther back

Fig. 13.—Left: Periapical roentgenogram showing an impacted third molar crown with the shadow of a dentigerous cyst overlying the distal root of the second molar. Right: Occlusal view in same case, showing a portion of the cyst shadow lying to the buccal side of the second molar root

fore, since the closer object is the one that moves in the opposite direction, it follows that R_1 (the curved portion of the root) is closer to the tube than R_2 (the rest of the root); therefore, the curvature is toward the buccal side. It makes no difference whether the roentgenograms are viewed as if from within the mouth or from outside the mouth; in either case the buccal object always moves in the direction opposite to the tube shift (Fig. 12, *A*).

A third method that might prove of some value in the determination of a buccal or lingual curvature is the "right angle" technic, in which a second film is placed as nearly as possible at right angles to the first film. In the case at hand, a periapical and an occlusal exposure would be made (Fig. 12, *D*). If the amount of root extending buccally or lingually is small, it may be observed in the occlusal view by the bulk of bone above and below it. In other instances the image of the crown may be superimposed over the shadow of the root, thus preventing its producing an image on the film.

■ *The Impacted Mandibular Third Molar*

The roentgenogram frequently reveals a horizontal impaction of a mandibular third molar with its crown overlapping the second molar. In contemplation of its removal these questions must be asked, and their answers sought in the roentgenograms: (1) Is the overlapping produced by the roentgen technic, or does a physical overlapping of the teeth

Fig. 14.—Clark's method of localization applied to the third molar. A: Standard periapical view reveals the third molar overlapping the second molar as far as the pulp canal of the distal root of the second. B: The tube is shifted distally, with the film in the same position. The cusp of the third molar now extends to the mesial surface of the distal root; that is, the third molar moved in the direction opposite to the tube movement; hence, the third molar is closer (buccal) to the tube than the second molar. C: Proof of localization. The occlusal roentgenogram reveals the third molar to be overlapping the second molar on the buccal side

exist? (2) Is the third molar lying to the buccal or lingual side of the second molar?

The answer to the first question may be found by ascertaining that the horizontal angle of the tube is such that the central ray is directed perpendicular to the mean tangent of the first and second molars. In examining the roentgenogram, one should note the contact point between the first and second molars. If these teeth are in normal alignment in the mouth, but are overlapping in the roentgenogram, it denotes incorrect horizontal angle and indicates that this is responsible, at least in part, for the overlapping of the second and third molars. If the first and second are not overlapped but the second and third are, there is a physical overlapping within the bone.

To determine whether the third molar lies to the buccal or lingual side of the second molar requires the application of one or more of the three methods described previously. By the "visual" method

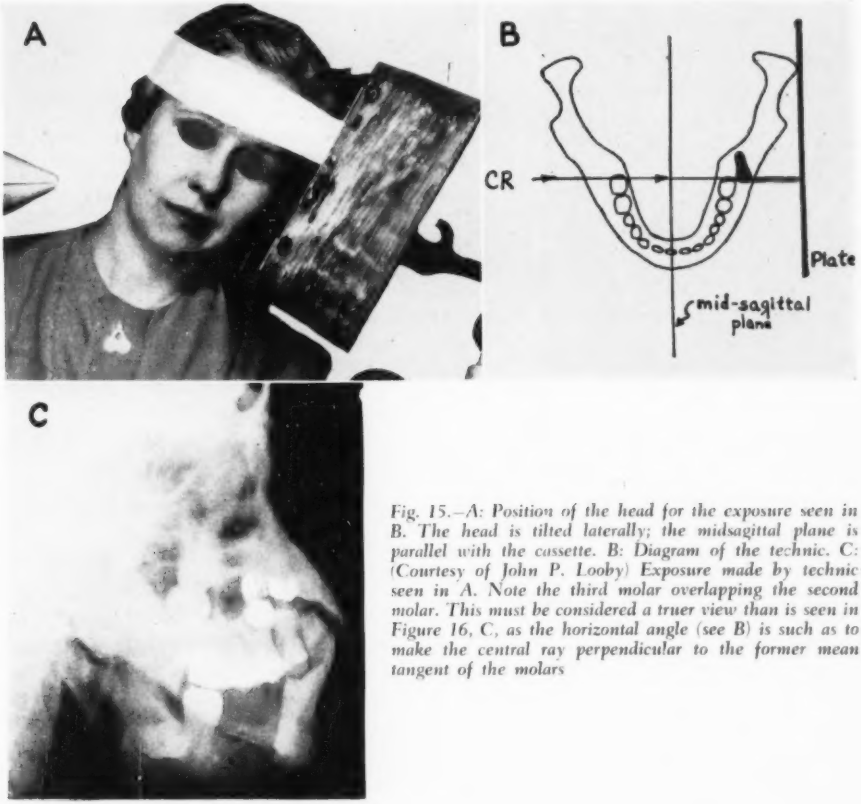


Fig. 15.—A: Position of the head for the exposure seen in B. The head is tilted laterally; the midsagittal plane is parallel with the cassette. B: Diagram of the technic. C: (Courtesy of John P. Looby) Exposure made by technic seen in A. Note the third molar overlapping the second molar. This must be considered a truer view than is seen in Figure 16, C, as the horizontal angle (see B) is such as to make the central ray perpendicular to the former mean tangent of the molars

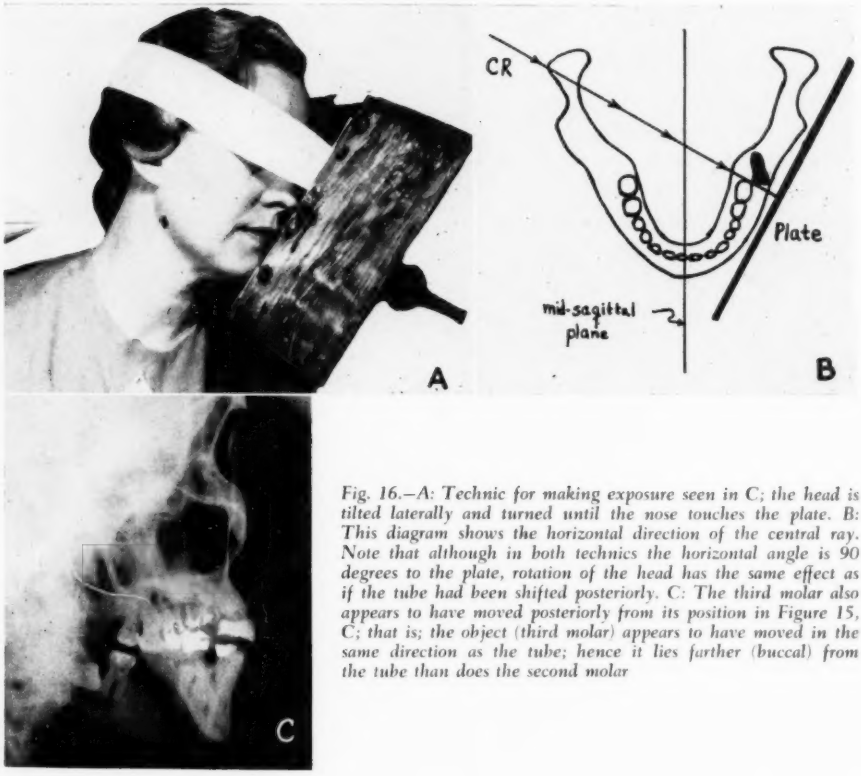


Fig. 16.—A: Technic for making exposure seen in C; the head is tilted laterally and turned until the nose touches the plate. B: This diagram shows the horizontal direction of the central ray. Note that although in both technics the horizontal angle is 90 degrees to the plate, rotation of the head has the same effect as if the tube had been shifted posteriorly. C: The third molar also appears to have moved posteriorly from its position in Figure 15, C; that is; the object (third molar) appears to have moved in the same direction as the tube; hence it lies farther (buccal) from the tube than does the second molar

it is necessary to decide whether the second or the third molar presents the sharper image in the overlap area. While this distinction is obvious in some cases, it is not reliable in others.

The "occlusal" method may be of great value in certain cases, and in such cases can produce a most accurate image of the relationship of the teeth (Fig. 13). The distance the film can be carried posteriorly is limited by the anterior border of the ramus. Usually the impacted tooth does not lie so far back in the ramus that at least a portion of its crown cannot be recorded on the film, but occasionally such a condition does exist and the occlusal film is of no help.

Clark's method should be employed when the occlusal technic is inadequate (Fig. 14). Periapical roentgenograms are employed when they can include the apex of the impacted tooth; extraoral roentgenograms are indicated where the films cannot be placed sufficiently far back to reach the apex. As described previously, the usual method is to make two exposures,

keeping the film and patient's head in the same position but varying the horizontal angle.

In the case shown in Figures 15 and 16, however, these conditions were changed somewhat, in that the film and horizontal angle (90 degrees to the film) were the same in both exposures, but the position of the patient's head was changed. In Figure 15, the more accurate film inasmuch as the central ray was directed more nearly perpendicular to the tangent of the molars (Fig. 15, *B*), the second and third molars are overlapped (Fig. 15, *C*). In Figure 16, the head is rotated so that the nose touches the plate. Although the horizontal direction of the central ray was directed at the plate in the same manner, the change in the head position changed the direction of the rays through the jaws; that is, it is the same as if the head had remained in the same position and the tube had been moved posteriorly (Fig. 15, *B* and 16, *B*). This second roentgenogram shows that the teeth are no longer overlapped, but that the third molar has moved posteriorly in relationship to the second molar; or, to put it another way, the third molar appears to have moved in the same direction as the movement of the tube. Therefore, it lies farther from the tube, which in this case would be buccal to the second molar.

■ *Summary*

1. Thoughtful consideration of every roentgenogram is necessary for accurate recognition and localization of conditions requiring surgical treatment.

2. A case of buccal curvature of a root apex is analyzed in regard to its roentgen image and its localization by Clark's method.

3. A case of an impacted mandibular third molar overlapping the second molar is discussed from the standpoint of localization from two lateral roentgenograms of the jaw.

■ Acquire Mental Knowledge

Do not imagine that the knowledge, which I so much recommend to you, is confined to books, pleasing, useful as that knowledge is. But I comprehend in it the great knowledge of the world, still more necessary than that of books. In truth, they assist one another reciprocally; and no man will have either perfectly who has not both. The knowledge of the world is only to be acquired in the world, and not in a closet. Books alone will never teach it to you; but they will suggest many things to your observations which might otherwise escape you; and your own observations upon mankind, when compared with those which you will find in books, will help you to fix the true point.—*Chesterfield, "Letters to His Son."*

Oral surgery in atomic warfare

■ *Russell W. Bunting, D.D.S., Washington, D. C.*

In the event of an atomic attack on this country the oral surgeons will occupy a strategic position in casualty relief service. It is probable that a large percentage of the injuries sustained will involve the face and jaws. There will be traumatic impacts with fractures of the maxillary and facial bones, contusions, jaw dislocations and facial burns.

Because of his intimate knowledge of the oral cavity and its relation to the adjacent head and neck structures, and his wide experience in surgical procedures in this field, the oral surgeon is qualified to treat injuries of the face and jaws. He therefore is recognized as a specialist. To them will be delegated the responsibility for the definitive care of injuries in his field of practice.

Oral surgeons, in civil defense planning, will be assigned to base or already existing hospitals where, in the event of a disaster, they will be given full charge of those casualties having oral and facial involvements. They are fully qualified to carry out their specific functions with little or no preparatory training. They therefore will constitute an integral unit of the hospital surgical team.

Some oral surgeons have had considerable training and experience in plastic surgery. Those who are qualified will work with the surgical teams in the definitive repair of facial, head and other bodily injuries.

In view of the importance of oral and maxillofacial surgeons in civil defense planning it is highly important that all those who are qualified should be registered with the civil defense organization and be given specific assignment to the hospitals in which they will operate. There should also be an alternate assignment in case the first location should be incapacitated.

This applies to all oral surgeons in every part of this country, even in those remote from probable target areas. They should constitute a mobile unit, consisting of the oral surgeon, his nurse and his necessary surgical equipment which could be transported by air to any scene of disaster in which their services are needed. Since the number of such specially trained workers available is so small it is highly important that they all be mobilized and alerted for immediate action in the event of a disaster either in their own community or in some distant site of an atomic attack.

Oral surgery has the opportunity and the privilege of rendering a highly important service in the event of a great national catastrophe. It must be organized and ready for action when the need arises.

Dental consultant, Health and Special Weapons Division, Federal Civil Defense Administration, Washington, D. C.

Treatment of old unreduced forward dislocation of the temporomandibular joints

■ *J. A. Harpman, B.Sc., M.B., M.S. (London), D.L.O. (England), Warwick, England*

It is generally stated that in cases of long-standing unreduced forward dislocation of the temporomandibular joints in which there is limitation of movement that cannot be reduced by closed methods, the correct treatment is mandibular condylectomy (Watson-Jones[1]) or replacement of the condyles into their original position by open operation (Blair and Ivy,[2] Stones,[3] Padgett[4]). Such functional impairment from this cause is uncommon. On the other hand, nonreduction of anterior dislocation of the temporomandibular joints leads to dental malocclusion and to appearances of mandibular prognathism (Fig. 1). While many methods for correcting the latter two conditions are described in works on oral surgery (Mead,[5] Thoma,[6] Padgett,[4] Winter,[7] Blair and Ivy[2]), search of the literature revealed only one report of treatment of these conditions in a case of long-standing dislocation of these joints; in this case bilateral mandibular condylectomy proved successful (Dufourmentel[8]).

Recently I treated a boy, aged 16 years, whose temporomandibular joints had been dislocated forward 11 years previously and had not been replaced (Fig. 2). The new joints that had developed allowed his mandible an almost normal range of movements, but mastication was imperfect because of gross dental malocclusion and his appearance was abnormal (Fig. 1).

We considered it unwise to try to replace the mandibular condyles into the temporal bone glenoid fossae in view of the length of time that had elapsed since the original injury and the good function of the existing false joints. We thought, however, that we could improve the patient's appearance and correct the dental malocclusion by a procedure that had been found successful in the treatment of mandibular prognathism, macrognathia or micrognathia. These conditions usually are treated by bilateral osteotomy of the mandible and subsequently fixation, for a time, of the upper and lower teeth in correct occlusion. Performance of the osteotomy above the inferior alveolar foramen preserves the inferior dental vessels and nerves. Blair[9] and Padgett[4] reported that

From the ear, nose and throat department, Warwick Hospital, Warwick, England.

1. Watson-Jones, R., *Fractures and Joint Injuries*, Vol. I. Edinburgh: E. & S. Livingstone, 1943.

2. Blair, V. P.; Ivy, R. H., and Brown, J. B., *Essentials of Oral Surgery*, London: H. Kimpton, 1936.

3. Stones, H. H., *Oral and Dental Diseases*. Edinburgh: E. & S. Livingstone, 1948.

4. Padgett, E. C., *Surgical Diseases of the Mouth and Jaws*. Philadelphia: W. B. Saunders, 1938.

5. Mead, S. V., *Oral Surgery*. London: H. Kimpton, 1947.

6. Thoma, K. H., *Traumatic Surgery of the Jaws*. London: H. Kimpton, 1942.

7. Winter, L., *Operative Oral Surgery*. London: H. Kimpton, 1947.

8. Dufourmentel, L., Surgical Treatment of Prognathism. *Presse méd.* 29:235 (March 23) 1921.

9. Blair, V. P., *Surgery and Diseases of the Mouth and Jaws*, ed. 3. London: H. Kimpton, 1918.

no harm results from division of the inferior dental artery, and MacGregor[10] reported arterial anastomosis across the midline of the mandible in one case.

Ostectomy of the body of the mandible may require removal of one or more teeth; it is the method of choice when the body of the mandible is unduly large (Waldron and others[11]). Pettit[12] has obtained good results, in cases of lower jaw prognathism, from division of the mandibular condylar necks, but we thought that in our type of case the exposure required for such a procedure might endanger branches of the facial nerve. Mandibular condylectomy for the correction of the lower jaw prognathism (Jaboulay,[13] Dufourmentel and Darcissac,[14] Du-

10. MacGregor, A., Arterial Supply of Mandible. *Proc. Roy. Soc. Med.* 39:347 (April) 1946.

11. Waldron, C. W.; Peterson, R. G., and Waldron, C. A., Surgical Treatment of Mandibular Prognathism. *J. Oral Surg.* 4:61 (Jan.) 1946.

12. Pettit, J. A., The Surgical Correction of Prognathism. (Bow-Back Angle in Neck of the Condyloid Process.) *J.A.D.A. & D. Cosmos* 25:1837, 1937.

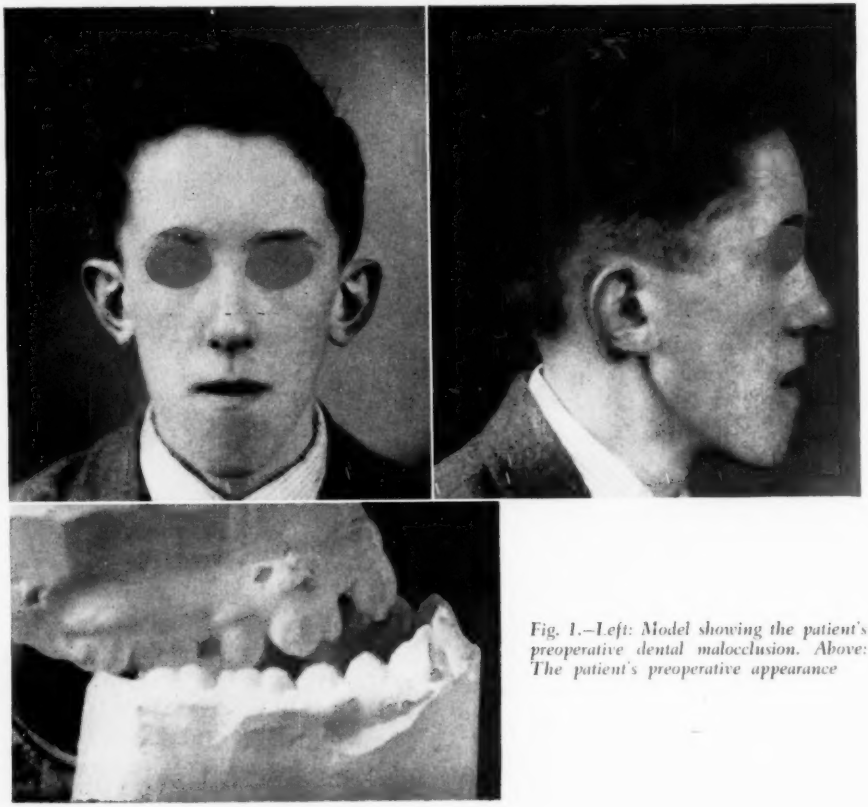


Fig. 1.—Left: Model showing the patient's preoperative dental malocclusion. Above: The patient's preoperative appearance

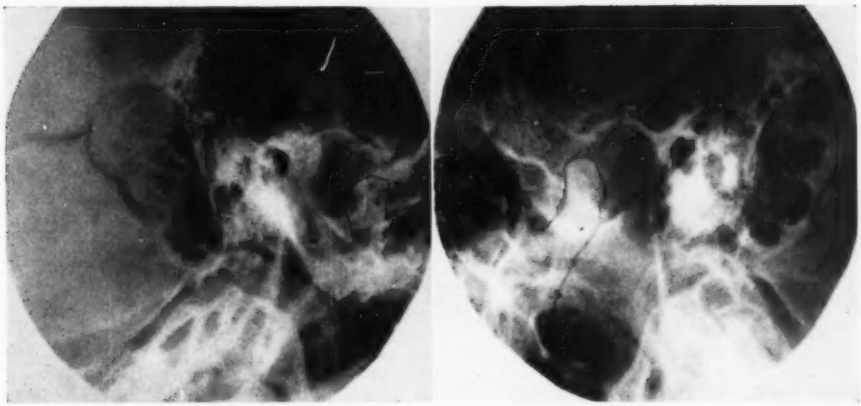


Fig. 2.—The temporomandibular joint dislocation in the case herein reported; the appearances were the same on both sides

fourmentel[8]) is considered unsatisfactory by Winter,[7] Hensel,[13] Landais,[15] Bourguet,[16] and Pettit.[12] Correcting mandibular prognathism by displacing the body of the mandible backward after osteotomy of the ramus has been objected to on the ground that, after this procedure, the space behind the angle of the lower jaw might be crowded when the mouth is opened (Blair and Ivy[2]). This probably applies mainly to cases in which the body of the mandible is unusually large, and this objection is not supported by experience (Henry,[17] Babcock,[18,19] Bruhn,[20] Weiss, Lentz and Newman,[21] Kostecka,[22,23] and Schmidt.[24-26] See Figure 3, *D*). These considerations render preferable for the osteotomy a site between the inferior alveolar foramen and the coronoid notch in most cases (Henry,[17] Bruhn,[20] Kostecka,[22,23] Hensel,[13] Dingman,[27] Waldron and co-workers[11]).

The osteotomy may be performed in a variety of ways. A vertical incision may be made along the posterior border of the ramus, and this may then be divided (Lane[28]) subperiosteally with a chisel (Schmidt,[24-26] Wymer,[29] Babcock,[18,19]), or

13. Hensel, G. C., The Surgical Correction of Mandibular Protraction, Retraction and Fractures of the Ascending Rami. Internat. J. Orthodont. & Oral Surg. 23:814, 1937.

14. Dufourmentel, M., and Darcissac, M. Quelques cas de resections condyliennes unilatérales et bilatérales avec presentation d'anciens operés. Rev. de Stomatol. 34:340 (June) 1932.

15. Landais, M., Le traitement chirurgical de la prognathie mandibulaire; etude critique de la résection bicondylienne et de l'osteotomie des branches montantes. Rev. de Stomatol. 36:209 (April) 1934.

16. Bourguet, J., Nouvelles remarques sur la résection bicondylienne et sur la section de la branche montante du maxillaire inferieur dans le traitement chirurgical du prognathisme. *Rev. de Stomatol.* 37:152 (March) 1935.

17. Henry, C. Bowdler, *Proc. Roy Soc. Med.* 39:646, 1946.

18. Babcock, W. W., The Surgical Treatment of Certain Deformities of the Jaw Associated with Malocclusion of the Teeth. (Operations on the Ramus of the Inferior Maxillary Bone.) *J.A.M.A.* 53:833, 1909.

19. Babcock, W. W., The Field of Osteoplastic Operations for the Correction of Deformities of the Jaw. *D. Items Interest* 32:439, 1910.

20. Bruhn, C., The Surgical-Orthopedic Correction of Deformities of the Jaw. *J.A.D.A.* 15:636 (April) 1928.

21. Weiss, B.; Lentz, M. J., and Newman, J., Correction of Severe Mandibular Protrusion by Osteotomy of the Rami and Orthodontics. *Am. J. Orthodont. & Oral Surg.* 27:1 (Jan.) 1941.

22. Kostecka, F., Die Chirurgische Therapie der Prognathie. *Zahnarztl. Rundsch.* 40:670, 1931.

23. Kostecka, F., Surgical Correction of Protrusion of the Lower and Upper Jaws. *J.A.D.A.* 15:362, 1928.

24. Schmidt, G., *Zentralbl. f. Chir.* 56:462, 1929.

25. Schmidt, G. *Zentralbl. f Chir.* 53 (pt. 2):2929, 1926.

26. Schmidt, G., *Zentralbl. f. Chir.* 55 (pt. 1):418, 1928.

with a Joseph's saw (Landais,[15] Waldron and co-workers[11]), or a modified pointed aneurysm needle may then be passed along the medial aspect of the ramus, hugging it closely, and be made to emerge through a small incision or puncture at the anterior aspect of the ramus just below the zygoma. A Gigli saw is attached to the needle, and this is then withdrawn so that the saw may be placed in position just medial to the bone, which may now be divided with it (Blair,[30, 9] Dingman,[27] Weiss, Lentz and Newman[21]). Hensel[13] stated a preference for a more thorough external exposure of the ramus and division of the bone with a small electric motor-driven rotating saw; Immenkamp[31] stated he used a "stab" saw. Moose[32] described an intraoral approach. Kostecka[22, 23] reported that he inserted a needle like that used by Blair through a small puncture at the posterior border of the ramus, on a level just below the lobule of the ear, and then used it to place a Gigli saw as described above. We adopted this method in our case. We used a Jenkins' tonsillec-

27. Dingman, R. O., Osteotomy for the Correction of Mandibular Malrelation of Developmental Origin. *J. Oral Surg.* 2:239 (July) 1944.

28. Brophy, T. W., *Oral Surgery*. Philadelphia: Blakiston Co., 1915.

29. Wymer, I., Zur operativen Korrektur der Prognathie. *Deutsche Zeitschr. f. Chir.* 215:226, 1929.

30. Blair, V. P., *Surg., Gynec. & Obst.* 4:67, 1907.

31. Immenkamp, Aloys, Die Chirurgische Behandlung des progen gelagerten Unterkiefers im bleibenden Gebiss. *Deutsche. Zahn, Mund u Kieferhlk.* 4:528, 1937.

32. Moose, S. M., Correction of Abnormal Mandibular Protrusion by Intra-oral Operation. *J. Oral Surg.* 3:304 (Oct.) 1945.

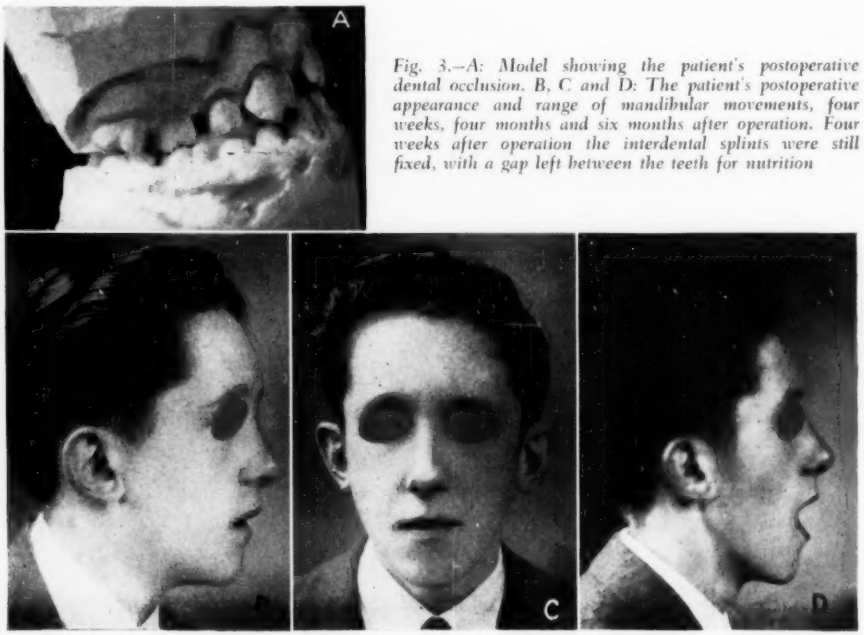


Fig. 3.—A: Model showing the patient's postoperative dental occlusion. B, C and D: The patient's postoperative appearance and range of mandibular movements, four weeks, four months and six months after operation. Four weeks after operation the interdental splints were still fixed, with a gap left between the teeth for nutrition

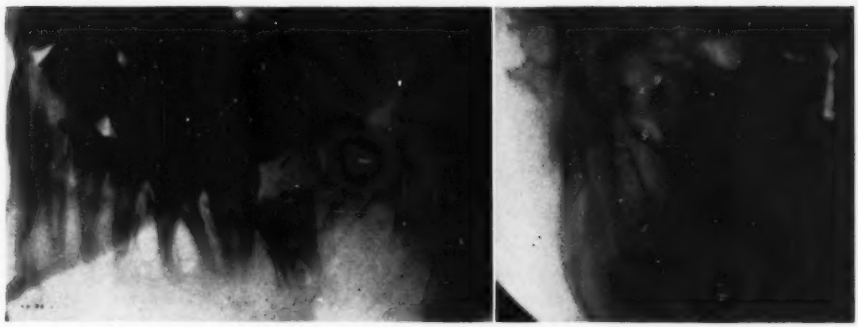


Fig. 4.—Left: Lateral roentgenogram of the mandibular osteotomy on the right side showing, also, the interdental splints in position, three and a half weeks after operation. Right: Anteroposterior roentgenogram of the mandibular osteotomy on the right side, 13 weeks after operation; the same procedure was carried out on the left

tomy suture needle, Kostecka's needle not then being obtainable. The puncture wounds were made with a no. 11 blade Bard-Parker scalpel, the posterior one being made down to bone and the anterior one only through skin. In dividing the bone, we found that a Gigli saw of sufficient strength must be used and that care is needed, when using it, not to damage the soft tissues between the puncture wounds. To this end, the wire saw may be covered with fine rubber tubing or with a special metal guard (Thoma,[6] Blair,[9] Grossman and co-workers[33]) introduced through the puncture wounds almost to the bone; it is especially at the anterior puncture that this precaution is necessary. Winter[7] advised dripping cool isotonic sodium chloride solution constantly onto the saw at the punctures, so as to prevent its overheating and consequent breaking or being held fast in the bone. Care is required, also, to stop sawing the moment the bone is divided, or the soft tissues superficial to it may be injured. The position of the saw may be checked roentgenographically. Some hemorrhage may result, which may be controlled by pressure dressings.

We performed this operation bilaterally under nasoendotracheal general anesthesia, but it may be performed under local anesthesia (Dingman,[27] Henry,[17] Waldron and co-workers[11]).

The teeth were fixed by cast metal cap splints that had been cemented onto upper and lower bicuspid and molar teeth on each side some days previous to the osteotomies. They had been made so that they could be fixed to each other on each side by a pin that passed through interdigitating rods that interlocked when the upper and lower jaws were placed in correct occlusion, as described by Henry[17] (Fig. 4, left). The splints were made so as to leave a gap between the teeth for eating purposes (Fig. 3, *B*). The number of weeks recommended for the fixing of such

33. Grossman, W.; Clarkson, P., and Green, A. H., Treatment of Severe Prognathism by Kostecka's Operation. *Brit. D. J.* 80:186 (March 15) 1946.

splints has varied from three (Bruhn[20]) to 12 (Kostecka[24]). We thought six weeks sufficient, but the splints were not removed for some months, during which they could have been fixed again had any recurrence of deformity been observed.

Although the osteotomies were conducted aseptically, we administered penicillin systemically for a few hours preoperatively and some days postoperatively. After operation, the mouth was kept clean by moist swabbing; only soft diet and fluids could be taken during the time the teeth were fixed. Postoperative pain and discomfort were slight. Some months after the operation, there was slight gagging on occlusion of the posterior teeth; this was corrected by extraction of the left upper second molar; its occurrence in this type of case may be due to altered muscle pulls (Dingman[27]).

Figure 3 shows the patient's dental occlusion and his appearance after the operation. The functional result is satisfactory in every respect, the patient now being able to partake of any diet and having a full range of mandibular movement (Fig. 3, *D*); he is gaining weight.

Roentgenograms illustrating the osteotomies are shown in Figure 4; the roentgenograms were taken three and a half and 13 weeks, respectively, after the operation. The union eventually obtaining between the bone fragments is probably often fibrous, but this does not always seem to prevent a satisfactory end result; disturbances due to excessive separation of the fragments led Dingman[27] to adopt the technic of wiring them together in corrected position, a procedure also favored by Waldron and others.[11]

■ *Summary*

A 16 year old patient, whose temporomandibular joints had been dislocated forward 11 years previously and had not been reduced, suffered from mandibular prognathism and dental malocclusion. These conditions were corrected by Kostecka's operation.

Author's note.—About 20 months after the operation described in this paper, information was received that the patient's mandibular deformity was recurring. Possibly the teeth were not kept splinted together for a sufficiently long time, or Kostecka's operation is not ultimately suitable for this type of case.

■ Search for Error

For the layman, the most important thing about science is this: that it isn't a search for truth but a search for error. The scientist lives in a world where truth is unobtainable, but where it's always possible to find errors in the long-settled or the obvious. . . . So-called "scientific" books that are supposed to contain final answers are never scientific. Science is forever self-correcting and changing; what is put forth as gospel truth cannot be science.—*Rudolf Flesch, "The Art of Clear Thinking."*

Thiopental sodium: a comprehensive review

■ *Myron Kaufman, D.D.S., Detroit*

Thiopental sodium (Pentothal) anesthesia is being increasingly used as a general anesthetic for oral surgical procedures performed in the office. Reports indicate that it is even being administered in some offices to the exclusion of other general anesthetics. While it is freely acknowledged that there is no anesthetic agent or combination of anesthetic agents best suited for all oral surgical procedures, there is a definite place for thiopental sodium in oral surgery. Although many physicians and dentists firmly maintain that this agent should be used only in the hospital, an enviable record of successful cases has been achieved by oral surgeons using the drug for office procedures. This fine record was possible because the agent was used mainly by those who were well trained in anesthesia, who also possessed a sound understanding of the pharmacodynamics of the agent, and were capable of coping satisfactorily with the complications that occasionally arose with its use.

■ *History*

The intravenous use of an anesthetic drug was reported as early as 1872, when Ore[1] used chloral hydrate with some success. In 1899 Dreser[2] reported the intravenous use of hedonal (methyl-propyl-carbinol-urethane), and in 1905 Krakow[3] reported a large series in which he used this drug intravenously without any deaths. Burkhardt,[4] in 1909, used ether in diluted solutions intravenously. However, according to Krantz and Carr,[5] the low solubility of ether in water and its volatility presented technical difficulties in its use. In addition, the injections of ether were painful and often produced hemoglobinuria. Bredenfield,[6] in 1916, successfully used morphine intravenously to produce narcosis.

The first barbiturate discovered was barbital (Veronal), which was synthesized by Fischer and Von Mering[7] in 1903. It was not until 1924 that it was used intravenously as an anesthetic in combination with di-allyl barbituric acid (Dial) under the name Somnifene. This was replaced in practice by amobarbital sodium in 1928.[8] Amobarbital had certain undesirable characteristics, however, in that it produced a prolonged sleep post-

From the department of oral surgery, Mount Carmel Mercy Hospital, Detroit.

1. Ore. Nouvelle note sur les injections intra-veineuses de chloral. *Bull. Soc. de Chir. de Paris*, 1:400, 1875.

2. Dreser, E. Ueber ein neue Hypnoticum aus der Reihe der Urethane. *Munchen. Med. Wchnschr.* 46:1310 (Oct. 3) 1899. (71 Vers. deutscher Naturforscher und Aerzte.)

3. Krakow, N. P. Ueber die Hedonal-Chloroform-Narkose. *Arch. f. Exper. Path. u. Pharmacol.* Suppl. Bd. 317, 1908.

4. Burkhardt, L. Ueber Chloroform und Aethernarkose durch intravenous Injektion. *Munchen. Med. Wchnschr.* 56:2365, 1909.

5. Krantz, J. C., and Carr, C. J. *The pharmacologic principles of medical practice.* Baltimore, Williams & Wilkins Co., 1949.

6. Bredenfield, E. Die intravenose Narkose mit Arzneigemischen. *Ztschr. f. Exper. Path. u. Therap.* 18:80 (April 4) 1916.

7. Fischer, E., and Von Mering, J. Ueber eine neue Classe von Schlafmitteln. *Therap. d. Gegenw., N. F.*, 5:97, 1903.

8. Hubbell, A. O. Intravenous Anesthesia in Dentistry. *Ann. Den.* 3:84 (Dec.) 1944.

operatively, which predisposed the patient to respiratory difficulties. Furthermore, in the recovery phase of anesthesia the patient often experienced a stormy period of delirium. In 1930 pentobarbital sodium (Nembutal) appeared, but its use was also accompanied by a prolonged recovery time.[9]

The first ultra-short-acting barbiturate was hexobarbital sodium (Evipal), introduced in Germany in 1932 by Weese and Scharpff.[10] This quickly replaced amobarbital and pentobarbital and was the best available anesthetic agent for intravenous use until thiopental sodium was introduced. Volwiler and Tabem, after extensive research with various barbituric acid salts as anesthetics for intravenous use, prepared thiopental sodium, which was given a successful clinical trial by Lundy and his associates at the Mayo Clinic in 1934.[11] This agent received an enthusiastic reception and has remained currently the most successful anesthetic for intravenous use.

■ *Preparation*

Barbituric acid salts (barbital, hexobarbital, pentobarbital) are derivatives of urea. Urea, an amino compound, when condensed with malonic acid forms malonylurea or barbituric acid, whose salt derivatives have anesthetic properties.[12]

Thiopental sodium, however, is a thiobarbiturate. A thiobarbiturate differs from a barbiturate in that the oxygen atom of the urea portion of the barbiturate molecule is replaced by a sulfur atom. To form a thiobarbiturate, thiourea is condensed in place of urea. A thiobarbiturate is more rapidly detoxified than a barbiturate and, therefore, is a short-acting anesthetic agent. This is clinically advantageous, for it reduces the anesthetic recovery period. Werner and his coworkers[13] dramatically demonstrated this in 1937. They administered a minimal hypnotic dose of thiopental sodium intravenously to a rabbit and produced a sleep that lasted five minutes. Pentobarbital, the oxygen analogue of thiopental sodium, administered under the same clinical conditions produced a sleep that lasted for 21 minutes.

■ *Chemical Properties*[5, 12, 14]

Thiopental sodium, or more specifically, sodium ethyl methylbutyl-thiobarbiturate ($C_{11}H_{17}O_2N_2SNa$) is a yellow hygroscopic powder possessing an aromatic sulfur-like odor and a bitter taste. It is readily soluble in water and alcohol. The drug is a vasoconstrictor with a pH of 11. There is some difference of opinion regarding the stability of the aqueous solutions on standing. The manufacturer recommends that the bulk solution be kept only 24 hours. The majority of writers report, however, that the solution will remain stable for 48 hours. On longer standing the solution hydrolyzes and becomes cloudy or discolored. Boiling the solution causes precipitation. The drug is dispensed as a dry powder in sealed sterile

9. Olson, B. A. Pentothal Sodium Anesthesia: Indications and Contraindications. J.A.D.A. 32:67 (Jan.) 1945.

10. Weese, H., and Scharpff, W. Evipan, ein neuartiges Einschlafmittel. *Deutsche Med. Wchnschr.* 58:1205 (July 29) 1932.

11. Lundy, J. S. Intravenous Anesthesia: Preliminary Report of the Use of Two New Thiobarbiturates. *Proc. Staff Meet. Mayo Clinic* 10:536 (Aug. 21) 1935.

12. Davison, F. R. *Synopsis of Materia Medica, Toxicology and Pharmacology*. 3rd ed. St. Louis, C. V. Mosby Co., 1944.

13. Werner, H. W.; Pratt, T. W., and Tatum, A. L. Comparative Study of Several Ultrashort-acting Barbiturates, Nembutal, Tribromethanol. *J. Pharmacol. & Exper. Therap.* 60:189 (June) 1937.

14. Adriani, J. *The Pharmacology of Anesthetic Drugs*. 2nd ed., Springfield, Chas. C Thomas, 1950.

ampules in 0.5 Gm., 1 Gm., 5 Gm., and 10 Gm. amounts.

■ *Physiologic Action*

Thiopental sodium is a hypnotic drug and not an anesthetic in the exact sense of the word. By producing a profound hypnosis, however, it causes a rapid loss of consciousness and a depression of reflexes similar clinically to that produced by an anesthetic agent.

Adriani[14] describes the systemic effects of thiopental sodium in general as follows: The drug depresses the cerebral cortex, gradually increasing the pain threshold until there is no response to stimuli under deep narcosis. Deep reflexes are depressed in deep anesthesia, but superficial reflexes may be present in light anesthesia. The pharyngeal reflex is not abolished, and local stimulation may elicit coughing. The laryngeal reflex is not abolished and may even be hyperactive, and spasm may occur on laryngeal irritation. The respiratory center is directly depressed. When the agent is first injected, a transient apnea may result, which soon passes. The minute volume of the lungs is decreased, oxygen consumption is decreased, while the total blood carbon dioxide remains unchanged. The vasomotor center is depressed, causing a fall in blood pressure, which may be as much as 40 mm. systolic. The heart rate is increased, but there is no disturbance of rhythm with adequate oxygenation. Intracranial pressure is usually decreased, probably from the fall in blood pressure. Thiopental depletes the glycogen reserve of the liver and raises the blood sugar level slightly. The nonprotein nitrogen is not changed, and there is no evidence of renal damage. There is no change in the bleeding time, coagulation time, white blood cells, red blood cells, differential count or hemoglobin concentration. There is no stimulation or secretion of mucus from the salivary glands or irritation to mucous membranes. Davison[12] states that there is a reduction of the gastric and pancreatic secretions but that they promptly return to normal after the drug is withdrawn. Peristaltic activity and tone of the gastrointestinal tract are diminished, and, since the vomiting center is not stimulated, postanesthetic nausea and vomiting are not common. The sphincters are relaxed in deep anesthesia. Muscular relaxation is poor and inadequate for major surgery, and muscle tremors may be present during surgery.

■ *Fate*

Thiopental sodium is generally classified as an ultra-short-acting barbiturate which is rapidly detoxified in the liver.[14] However, the literature abounds with a variance of opinion as to whether the liver is the primary site of this detoxification. Brodie and co-workers[15] expressed the belief that fundamental knowledge concerning the physiological disposition and chemical fate of the drug in the body was lacking, chiefly because of the lack of a suitable method for the determination of thiopental in the body. In 1949 they devised a method of isolating thiopental from biologic material without interference from the transformation products of thiopental. In this method thiopental was isolated from acidified biologic mate-

15. Brodie, B. B., and others. Fate of Thiopental in Man and Method for Its Estimation in Biological Material. *J. Pharmacol. & Exper. Therap.* **98**:85 (Jan.) 1950.

rial by extraction into petroleum benzin, returned to alkali, and then assayed by its absorption in the ultraviolet spectrophotometric curve. Their conclusions were as follows:

> (1) Only about 0.3 per cent of administered Pentothal is excreted unchanged, showing that the drug is almost completely transformed in the body; (2) . . . the rate of this transformation is slow in man, about 15 per cent per hour. The rapid decline in plasma levels and quick recovery following a single intravenous dose is probably due to the drug leaving the body fluids and being deposited in the fat and not due to rapid transformation in the body as is commonly believed; (3) it is short-acting only when rapidly administered in small doses. As the equilibrium between plasma and tissues is established, further decline in plasma levels becomes dependent only on the rate of metabolism of the drug which, as previously stated, is slow; (4) the rate of transformation does not vary for different doses in the same subject, but does vary somewhat from subject to subject.

Kohn-Richards and Grimes[16] had similarly concluded that the rate of detoxification varies with the method of administration, the rate being faster after a single initial intravenous injection and slower after injection of a similar amount by slow intravenous infusion.

In 1949, Shideman and co-workers[17] reviewed the literature concerning the role of the liver in the detoxification of thiopental. They objected to the reported conclusions on the basis that they were derived either from insufficient clinical observation or from poorly designed animal experiments. They therefore attempted to settle this controversial problem by scientifically planned experiments in man as well as in animals. They demonstrated the occurrence of a significantly longer duration of action of a standard dose of thiopental sodium in patients with liver dysfunction than in patients with a normally functioning liver. Data from their experiments definitely implicated the liver as the major organ of detoxification of thiopental in both man and animals. Krantz and Carr[5] had previously concluded that, since the anesthesia produced by thiopental sodium on partially hepatectomized rats is not prolonged, the body is not solely dependent on the liver for the detoxification of thiopental. Shideman,[17] however, was able to demonstrate the role played by the liver in this detoxification only when 80 to 90 per cent of the hepatic tissue was removed. It was concluded, therefore, that a small or moderate decrease in liver function does not decrease the detoxification rate. Furthermore, when part of a normally functioning liver is excised, the remaining liver, if over 30 per cent, will hypertrophy and functionally compensate for the partial loss of tissue.

Adriani[14] attributes the mild depression present after "awakening" to the degradation products of the drug.

■ *Uses*

Thiopental sodium is advantageously used for extremely apprehensive patients and those who are excited and nervous. Alcoholics and athletic persons similarly can be anesthetized without the difficulty, struggling and anoxia that often accompany inhalation anesthesia. For short

16. Kohn-Richards, R., and Grimes, C. Detoxification of Barbiturates and Influence of Method of Administration: Demonstrated With Nembutal and Pentothal. *Anesth. & Analg.*, **18**:139 (May-June) 1939.

17. Shideman, F. E., and others. Role of the Liver in Detoxification of Thiopental (Pentothal) by Man. *Anesthesiology* **10**:421 (July) 1949.

minor procedures that require little relaxation, thiopental sodium can be used alone with oxygen. The drug can also be used to facilitate the pleasant induction of nitrous oxide inhalation anesthesia, or it may be used for basal narcosis in conjunction with nitrous oxide or local anesthesia. Explosion and fire hazards are minimized when this agent is used for procedures in which cautery or electrical equipment are employed. Convulsive states produced by stimulating drugs (local anesthetics) or following increased irritability of the central nervous system (tetanus) are relieved by intravenous use of thiopental sodium.

■ *Advantages*[18]

1. Induction is simple, rapid and pleasant to the patient, anesthesia usually occurring within 30 seconds.

2. The minimum of apparatus is required.

3. Postanesthetic nausea or vomiting are infrequent.

4. The drug does not stimulate the production of secretions in the respiratory tract.

5. The drug does not cause irritation to the mucous membrane of the respiratory tract.

6. Recovery is prompt if minimal doses are employed – more so if the initial dose produces sufficient anesthesia for the procedure than if intermittent doses are administered to produce the desired depth of anesthesia.

■ *Disadvantages*[18]

1. The anesthesia is not completely controllable. Once the drug is in the vein, it cannot be retrieved, and its effects remain until it is detoxified. The possibility of overdosage can be minimized by administering the drug slowly in small amounts at a time.

2. The necessary effective dose is difficult to estimate, because of differences in susceptibility of individuals to barbiturates.

3. Laryngeal and pharyngeal reflexes are not abolished, and laryngeal spasm may develop.

4. Respiratory depression occurs, accompanied by a progressive decrease in sensitivity of the respiratory center to carbon dioxide.

5. When the drug is used alone, the muscular relaxation produced is not satisfactory for major surgery.

6. Three workers are necessary to the success of the anesthesia: a trained anesthetist, a cooperative surgeon and a competent assistant.

7. There are no completely reliable signs of anesthesia.

8. Thiopental sodium is a barbiturate and does not possess analgesic properties.

9. Venipuncture is sometimes difficult.

■ *Contraindications*

ANEMIA—The decreased oxygen-carrying capacity of the blood is particularly hazardous if respiratory depression occurs. The anoxia that results is not easily detected, since a person with a hemoglobin less than 45 per cent may not show signs of cyanosis.[19] Everson[20] does not advise the

18. Adriani, J. *Techniques and Procedures of Anesthesia.* Springfield, Chas. C. Thomas, 1949.

19. Noble, A. B. Anesthetic Emergencies. *Canad. Med. A.J.* 56:490 (May) 1947.

20. Everson, S. Evaluation of Nitrous Oxide and Pentothal Sodium Anesthesia in the Practice of Oral Surgery. *Oral Surg., Oral Med. & Oral Path.* 2:24 (Jan.) 1949.

use of thiopental sodium if the red blood cell count is below 2,500,000 per cubic millimeter.

HYPOTENSION—Since thiopental sodium depresses the vasomotor center, hypotension is enhanced. Thomas[21] states that the fall in systolic pressure may range from 8 to 40 mm. and that this fall is directly related to the rapidity of the administration of the drug. Therefore, if the blood pressure is less than 100 mm. systolic, the use of thiopental sodium is contraindicated.

NONCOMPENSATED DIABETES OR ACIDOSIS FROM ANY CAUSE—Respiratory depression may enhance acidosis by causing a retention of carbon dioxide in the tissues.

IMPAIRED RESPIRATORY FUNCTION—Anoxemia produced by the respiratory depression caused by thiopental sodium may be enhanced by chronic pulmonary diseases when a low vital capacity is present or by acute or chronic respiratory obstructions. Structural abnormalities, such as ankylosis of the jaws, nasal polyps or enlarged tonsils, and infections of the floor of the mouth and neck manifested by edema, in general, are contraindications for the use of thiopental sodium. However, the judgment of the anesthetist and his skill in performing intratracheal intubations should be the deciding factor in these situations.

OPERATIONS IN THE PHARYNX, LARYNX OR BRONCHI—The use of thiopental sodium is contraindicated unless the possibility of obstruction from laryngeal spasm is prevented by the use of intratracheal intubation.

CARDIAC DISEASE WITH DECOMPENSATION—Respiratory depression may be harmful to a diseased circulatory system. Furthermore, in large doses thiopental sodium may depress the myocardium.[18]

DISEASES OF THE LIVER—The use of thiopental sodium is not contraindicated in liver disease except when hepatic dysfunction is sufficiently pronounced or of a type that might interfere with the detoxification process (see fate of thiopental).

OPERATIONS OF UNDETERMINED LENGTH—Repeated administrations of thiopental sodium may be necessary to permit completion of the operation. This may cause severe depression of respiration and circulation from the cumulative effects of the drug.

EXTREMES OF AGE—Opinion is varied as to whether the drug should be administered to children under 10 years of age or to old patients. Although thiopental sodium has been administered successfully to children, they often require relatively larger amounts of the drug, because of increased metabolic rates, and their recovery time may be prolonged.[18, 20] Everson[20] further states that, provided general health is good, the use of thiopental sodium may be indicated rather than contraindicated, particularly if the patient is apprehensive.

OPERATIONS REQUIRING MUSCULAR RELAXATION—Thiopental sodium does not produce satisfactory muscular relaxation

21. Thomas, G. J. Pentothal Sodium—Pharmacologic Action, Range of Usefulness, Complications and Their Management. *Anesth. and Analg.* 23:8 (Jan.-Feb.) 1944.

and should be supplemented with curare when such relaxation is required.

■ *Complications*

INJECTION INTO AN ARTERY—Arteriospasm may be caused by accidental intra-arterial injection, and gangrene of the extremity may follow the spasm.[18] The United States Army Medical Department[22] suggests two precautions for the prevention of such accidental injection: (1) Check the color of the aspirated blood before injecting the agent, and (2) inject several drops, then wait a few seconds. If there is no pain, one may assume that a vein has been entered. In addition, the selected venous vessel can often be palpated for pulsations.

The treatment for injection into an artery is the immediate injection of 2 per cent procaine hydrochloride and the application of hot moist packs.

SLOUGHING OF SKIN—This is caused by subcutaneous extravasation of concentrations over 2.5 per cent or to extravascular injection of the alkaline solution. Should the latter occur, one should immediately inject 1 or 2 per cent procaine hydrochloride into the area. This causes vasodilation and averts sloughing.[18]

COUGHING, SNEEZING OR HICCOUGHING—These are annoying complications which may elicit a laryngospasm by stimulating the larynx. Coughed up secretions, in particular, may do this. The complication is treated by rapid increase of the depth of anesthesia. At least 5 cc. of a 2.5 per cent solution of thiopental sodium should be injected at once. Oxygen administered under pressure may also help to relieve the condition.[20]

RESPIRATORY DEPRESSION OR FAILURE—This is usually due to an overdosage, too rapid induction or the cumulative effect from using large quantities over long periods of time. If respiratory depression occurs, oxygen should be given at once and the administration of thiopental sodium discontinued until normal respiration returns. For respiratory failure, artificial respiration with the administration of oxygen under pressure is indicated.

CARDIAC ARREST—Bruce[23] states that cardiac arrest during thiopental sodium administration occurs with no greater frequency than with the use of any other general anesthetic. He recommends that, should cardiac arrest occur, intravenous injections of epinephrine be given in doses of 3 to 5 cc. in 1:100,000 solution. Pounding with the closed fist over the heart at a rate of 50 to 60 times per minute with a severe definite blow may be tried for a few seconds. If the emergency persists, direct injection into the heart or direct cardiac massage is indicated. A conscientious surgeon will familiarize himself with the technics for cardiac massage even though such extreme emergencies would rarely occur in dental office anesthesia.

LARYNGOSPASM—The most common objection to the use of thiopental sodium in oral surgical procedures is that it encourages laryngospasm. Adriani[18] defines laryngeal spasm as "a spasm of the adductor muscles of the vocal cords which causes a partial or complete obstruction of the

22. Inadvertent Injection of Sodium Pentothal Into an Artery (Abst.). *Bull. U. S. Army Med. Dept.* 86:32 (March) 1945.

23. Bruce, E. A. Complications in the Administration of Thiopental Sodium. *J. Oral Surg.* 7:292 (Oct.) 1949.

natural airway. The spasm may be complete or partial." Symptoms of partial spasm are wheezing, crowing, phonation and grunting on inspiration or expiration. The vocal cords are not completely approximated. In complete spasm the vocal cords are completely approximated as manifested by apnea and inability to inflate the thorax. Since thiopental sodium may cause parasympathetic stimulation of the autonomic nervous system, the possibility of eliciting a laryngospasm is increased in the following ways:

1. Secretions in the larynx, such as blood, vomitus or mucus, may initiate the spasm.

2. Mechanical stimulation from airways, suction tips, laryngoscope or other foreign bodies.

3. Reflex stimulation from traction on the trachea.

4. Anoxia which may cause spasm of all the muscles, including those of the vocal cords.

5. Carbon dioxide excess.

6. High concentrations of inhalation drugs may irritate the membranes of the larynx and produce a spasm. When thiopental sodium is supplemented with vinyl ether or ether, the agent should be introduced slowly.

Laryngospasm should be treated with skill and expedience. Oxygen under pressure should be administered immediately. Many times forced oxygen alone will break a spasm. An adequate open airway should then be assured by aspirating secretions and foreign material from the oropharynx. If laryngospasm occurs in the early stages of anesthesia, the injection of small amounts of thiopental sodium usually will deepen the anesthesia and may stop the spasm. Vagal reflexes are extremely sensitive when anesthesia is light, while the posterior laryngeal reflexes are abolished in the lower first plane of the surgical stage of anesthesia. If these measures fail to relieve the spasm, intratracheal intubation should be performed. Often an attempt to pass an endotracheal tube during laryngospasm will tend to increase the spasm. The intravenous administration of curare or *d*-tubocurarine, 2 to 4 cc., is indicated to obtain muscular relaxation of the glottis without increasing the depth of anesthesia ordinarily required to facilitate intubation. Placing the patient in slight Trendelenburg position will facilitate rapid intubation while promoting postural drainage of secretions. Since curare is a respiratory depressant and thiopental sodium has a slight curare-like action of its own, the anesthetist must be prepared to provide artificial respiration with the anesthetic machine until restoration of normal breathing. Neostigmine, 1 cc. of 1:2,000 solution, is the physiologic antidote for a toxic dose of curare and should be on the emergency tray. The effects of curare are entirely eliminated in 20 minutes. The extreme treatment for laryngospasm is tracheotomy. Four minutes of respiratory arrest from any cause is the limit of safety without the possibility of producing irreversible changes. If by this time curare has not broken the spasm, a tracheotomy is indicated; every oral surgeon should know how to perform one and should have a tracheotomy set available at all times.

PROLONGED NARCOSIS OR THIOPENTAL INTOXICATION—Degradation products from partial detoxification of thiopental

accumulate in the tissues if large doses are administered or if the drug is not detoxified rapidly. The limit should be approximately 1 Gm. of the drug for an adult. Toxic manifestations resulting in death are almost unknown with the use of thiopental sodium, but death can result from extreme overdosage. Intoxication is treated by first providing an airway, preferably by intratracheal intubation, and administering oxygen under pressure. Intravenous fluids for secondary shock and the maintenance of water balance should be started and the patient kept warm by external application of heat. If circulatory depression is severe, 25 to 50 mg. ephedrine sulfate should be given subcutaneously. Penicillin should be given as a prophylactic against bronchopneumonia. Analeptics have been recommended for many years in the heroic treatment of respiratory depression from barbiturate intoxication. Picrotoxin (1 to 3 mg. per cubic centimeter), nikethamide (Coramine) (1 to 3 cc. of a 25 per cent aqueous solution), pentylenetetrazole (Metrazol) (0.1 to 0.3 Gm.) or caffeine and sodium benzoate (0.2 Gm.) are the most commonly recommended stimulants.[14] Picrotoxin is the antidote of choice.[5] Picrotoxin does not act on the thiopental itself but stimulates the central nervous system and thus produces an "awakening effect." The dosage must be repeated to continuously antagonize the effect of the thiopental until sufficient detoxification of the anesthetic occurs. The picrotoxin is administered intravenously, 2 cc. (6 mg.) every 20 to 30 minutes until the patient is out of danger.

Everson[20] does not recommend the use of analeptics. He brings to attention the reports of several investigators who have found certain contraindications to their use. Schmidt[24] states that analeptics increase the oxygen demand of the higher centers and thus increase hypoxia. Mousel and Essex[25] likewise have shown that analeptics increase respiratory depression and have no value in resuscitation. It is probably best to administer an analeptic only when all other supportive measures have failed.

■ *General Preanesthetic Considerations*

It is particularly advisable to take a history of each patient. It may disclose a condition contraindicating the use of thiopental sodium. If the patient is being treated by a physician, the physician should be consulted and his permission obtained before any general anesthetic is administered. All patients should be advised to take no food or fluids for four hours preceding the operation, and that the bladder and bowels should be emptied immediately prior to anesthesia.

■ *Premedication*

Since the use of thiopental sodium in office procedures is being considered primarily here, it is desirable that recovery time be minimal and the patient be able to leave the office safely as soon as possible. For this reason it is desirable to secure as little depression as possible, either by premedication or by the anesthetic agent.

24. Schmidt, C. F. Recent Developments in Respiratory Physiology Related to Anesthesia. *Anesthesiology* 6:113 (March) 1945.

25. Mousel, L. H., and Essex, H. E. An Experimental Study of the Effects of Respiratory Stimulants in Animals Under Pentothal Sodium Anesthesia. *Anesthesiology* 2:272 (May) 1941.

Premedication is limited in a majority of the cases to the use of atropine sulfate, 0.0006 Gm. (1/100 grain) administered intravenously at the time of induction. Atropine is a para-sympathetic depressant and is used to decrease the secretion of mucus and saliva, which often elicit laryngospasm. Atropine also decreases the carotid sinus reflex.

Patients who are extremely apprehensive should have the benefits of premedication to decrease psychic trauma, speed induction and more easily maintain a desirable depth of anesthesia. A short-acting barbiturate is satisfactory in this case. Pentobarbital sodium, 0.1 Gm., may be given by mouth one and a half hours before the anesthetic. The depression produced by this premedication is usually dissipated by the time of induction. If some depression remains, however, recovery will be prolonged and the signs of anesthesia further masked.

■ *Dosage*

A 2.5 per cent solution of thiopental sodium in distilled water is advised for intravenous use. A more concentrated solution is not recommended, because it increases the possibility of phlebitis and irritation to the surrounding tissue if extravascular injection occurs. Furthermore, a more concentrated solution increases the possibility of laryngospasm and makes the control of dosage more difficult.[26] The total dose for an average adult should not exceed 1 Gm.

Since the rate of detoxification is fastest after a single intravenous injection of thiopental sodium, for short operations the initial dose should be of an amount sufficient for the duration of the procedure. That amount is dependent on the age, body build, weight, nervous state, general health and estimated time of operation. The anesthetist should coordinate the depth of anesthesia with the sequence of technical stages of the operation, for different tissues vary in their threshold of response to pain stimuli. Incision of the mucosa, reflection of the mucoperiosteum and removal of teeth require deeper anesthesia than that needed for bone trimming or suturing. Krogh[27] advises, therefore, that anesthesia be deeper at the beginning of the procedure than at the finish.

■ *Operating Position*

Peterson[28] recommends a sitting position in the dental chair for general anesthesia with thiopental sodium. The airway is maintained more easily and obstruction is less common in this position. Furthermore, respiratory activity and capacity are greater when a patient is sitting up, because of the freer function of the diaphragm and other musculature. This compensates to some extent for the respiratory depression caused by the thiopental sodium. The supine position is recommended for more extensive surgery, when there may be excessive bleeding, when the operative procedure will be prolonged, and when intratracheal intubation is advisable.

■ *Administration*

The use of a sharp needle and the proper technic of venipuncture contribute

26. Hubbell, A. O. Pentothal Sodium Anesthesia for Dental Surgery in Office Practice and Control of Recovery Time. *Anesthesiology* 4:174 (March) 1943.

27. Krogh, H. W. Use of Thiopental Sodium in Dental Surgery. *J. Oral Surg.* 5:337 (Oct.) 1947.

28. Peterson, R. G. Anesthesia in Oral Surgery. *J. Oral Surg.* 7:231 (July) 1949.

to the factors that make anesthesia with thiopental sodium less unpleasant for the patient. With practiced skill a 20 to 23 gage needle can be introduced into the vein almost painlessly. The median basilic vein in the cubital fossa is usually used. In cases of obesity, where there is difficulty in locating a suitable vein in this region, other locations can be employed, such as the back of the wrist, the ankle or, in special cases, the neck.

The literature abounds with satisfactory technics for the administration of thiopental sodium. Various methods for supporting and stabilizing the arm of the patient and holding the syringe have been devised.[9, 29, 30, 31] Dispensers for accurately and automatically controlling the amount of anesthetic solution delivered have also been designed and advantageously used.[8, 30, 32] The most satisfactory technic, however, is that which is most easily handled by the anesthetist on the basis of his skill, needs and available facilities. Investigation of all reported technics of administration is a must for the conscientious anesthetist.

Minor variations in administering the induction dosage are reported, but the following technic as described by Stanton[33] is generally acceptable. Initially, 3 to 6 cc. is given quickly and 25 to 30 seconds allowed to elapse, during which the patient's reactions are noted. If after 30 seconds anesthesia has not occurred, intermittent doses of thiopental sodium are administered, approximately 2 cc. per injection at 15 to 30 second intervals. Absence of the eyelash reflex or lack of response to painful stimulus at the field of operation indicates sufficient depth of anesthesia. A mouth prop is then inserted, although it is advisable to insert this before induction when the contemplated surgery does not require the depth of anesthesia sufficient to produce complete relaxation of the jaw. The oropharynx is then carefully screened off with a gauze pack of sufficient size to prevent saliva, mucus or blood from entering the pharynx.

THIOPENTAL SODIUM IN COMBINATION WITH OTHER AGENTS—Thompson[34] has advocated the injection of the operative field with procaine hydrochloride after anesthesia has been induced with thiopental. Schultz and Guralnick[29] similarly advise the additional use of local anesthesia, for two reasons:

> First, sensory nerve fibers are blocked at their source and the initial stimulation of the patient by the surgical procedure is eliminated. Thus a light plane of anesthesia, always to be desired, can be used. The time required for postoperative recovery is reduced and . . . minimized. Second, the use of procaine with incorporated epinephrine reduces bleeding. . . .

It also counterbalances the vasodilatory effect of the thiopental sodium.

It is to be noted that a combination of anesthetic agents is being used with increasing frequency. This is known as

29. Schultz, P. E., and Guralnick, W. C. Advances in General Anesthesia: Pentothal Sodium and Curare. J.A.D.A. 36:140 (Feb.) 1948.

30. Peebles, E. A. Anesthesia for the Oral Surgeon. *D. Digest* 53:597 (Dec.) 1947.

31. Stallcup, L. B. Pentothal Sodium Anesthesia Using Automatic Control Syringe Method. *J. Oral Surg.* 4:1 (Jan.) 1946.

32. Woodward, C. M. Accurately Metered Method of Administering Sodium Pentothal. *D. Digest* 54:547 (Dec.) 1948.

33. Stanton, C. O. Pentothal Sodium Intravenous Anesthesia in the Dental Office. *Tufts D. Outlook* 22:7 (May) 1949.

34. Thompson, E. C. Continuous Pentothal Sodium Analgesia With Nerve Block in Oral Surgery: an Analysis of 100 Consecutive Cases. *J. Oral Surg.* 3:205 (July) 1945.

"balanced anesthesia,"[35] for by combination the agents used act synergistically, one agent supplying qualities that are missing in another agent.

For this reason nitrous oxide is frequently used as a supplement to thiopental sodium for all but short procedures. Thiopental sodium alone is a depressant with a cumulative effect, while nitrous oxide when used alone must be administered with dangerously low levels of oxygen to obtain and maintain proper depth of anesthesia. In addition, induction with nitrous oxide is often slow and accompanied by a stormy stage of excitability and anoxia. When the two agents are combined, these undesirable effects are minimized and the desirable properties emphasized. Thiopental sodium used as an induction agent produces a rapid, smooth anesthesia, while the mixture of nitrous oxide and oxygen is administered for maintenance. The latter affords an atmosphere of oxygen that fulfills the physiologic requirements and at the same time produces a weak anesthetic effect of relatively low nitrous oxide percentage. The analgesic properties of nitrous oxide also enhance the hypnotic effect of the thiopental.[29] This mixture reduces the amount of thiopental sodium required, decreases the possibility of cumulative effects from long-continued administration or repeated injections of thiopental sodium and facilitates safer anesthesia with more rapid recovery.[36] Further safety is achieved by the fact that nitrous oxide reduces the tendency toward laryngeal spasm by depressing the pharyngeal reflex, and nausea—so common when nitrous oxide is used alone—is rare when the agents are used in combination.[37]

Barton, Wicks and Livingstone[38] demonstrated the value of combined anesthesia in a study of the comparative effects of thiopental sodium in combination with 100 per cent oxygen or 50:50 nitrous oxide-oxygen mixture. They reported that the blood oxygen and carbon dioxide values are about the same in the two combinations, but the total dose of thiopental sodium necessary to maintain the same level of anesthesia when combined with the nitrous oxide-oxygen mixture is only one-fourth that necessary when thiopental sodium is used alone or with oxygen.

The technic of administration of this combination of anesthetic agents is relatively simple. Induction with thiopental sodium is performed as previously described. When consciousness is lost and the eyelash reflex is gone, the nasal inhaler is applied and an 80:20 or 70:30 mixture of nitrous oxide-oxygen is introduced under a pressure of 3 to 7 mm. Should one desire greater percentages of oxygen or assurance of satisfactory maintenance in particularly long procedures vinyl ether (Vinethine) may be introduced in low concentration to complement the nitrous oxide.

Field and Ackerman[39] reported on the use of a combination of intravenous pentobarbital sodium and thiopental

35. Lundy, J. S. Balanced Anesthesia. *Minnesota Med.* 9:399 (July) 1926.

36. Everson, S. Thiopental Sodium in the Practice of Oral Surgery. J.A.D.A. 38:163 (Feb.) 1949.

37. Thompson, E. C., and Sleeper, H. R. General Anesthetic Methods With Special Reference to Thiopental Sodium. *J. Oral Surg.* 8:121 (April) 1950.

38. Barton, G. D., Wicks, W. R., and Livingstone, H. M. The Effect of Pentothal Alone and in Combination With Oxygen or Nitrous Oxide-Oxygen on Arterial Blood Gases. *Anesthesiology* 7:505 (Sept.) 1946.

39. Field, H. J., and Ackerman, A. A. The Intravenous Use of Nembutal-Pentothal Sodium Combination with Nitrous Oxide and Oxygen for Dental Anesthesia. *Oral Surg., Oral Med. & Oral Path.* 5:43 (Jan.) 1952.

sodium. They found that the two barbiturates in combination complement each other, for pentobarbital sodium prolongs the anesthesia and reduces the amount of thiopental sodium needed. This is of particular advantage in prolonged surgical procedures. The intravenous drugs are used for induction and nitrous oxide and oxygen for maintenance.

Trichloroethylene seems to be gaining favor as a substitute for vinyl ether as a complemental agent. Trichloroethylene is less irritating, can be introduced more rapidly and produces quicker induction. Furthermore, it allows speedy recovery and is less expensive than vinyl ether since smaller quantities are necessary.

Curare has also been advocated as a supplement to thiopental sodium to obtain additional relaxation while maintaining the patient at a relatively shallow plane of anesthesia.[29] Gray and Halton[40] concluded from clinical observations that curare potentiates the anesthetic effects of thiopental sodium so that less thiopental sodium is required to accomplish a given depth and duration of anesthesia. Paulson and co-workers,[41] however, in animal experiments observed no potentiation, they found no significant difference between the length of narcosis produced by thiopental sodium with or without the supplementation of curare. The only difference was the greater degree of relaxation produced when curare was used with thiopental sodium.

■ *Clinical Signs and Stages of Anesthesia*

Since thiopental sodium is usually administered rapidly and in strong concentration to produce rapid induction and surgical anesthesia, the earlier stages are telescoped so that the signs are either missed or are not well defined. The signs of anesthesia can be more easily differentiated, however, when the drug is given slowly in dilute solution. These clinical signs, although consistent for any given state, are not abrupt but develop gradually from one stage to the next.[42]

Etsten and Himwich[42] have divided the pattern of thiopental sodium anesthesia into four stages, each having diagnostic clinical signs correlated to a neuroanatomic depressing effect on the brain. These stages are associated with (1) a progressively descending depression of cerebral metabolism, beginning with the cerebral hemispheres and extending to include the lower parts of the brain, and (2) a specific effect of interference with the nervous activity of the hypothalamus.

The stages are described as follows:

STAGE I. CLOUDED CONSCIOUSNESS—With rapid induction this stage lasts about 20 to 45 seconds. The patient sometimes can taste the drug. Voluntary motor activities become impaired, and euphoria is a characteristic manifestation. The patient may still respond to questions, but answers are sluggishly given, indicating cerebral cortical depression. There is loss of fine discrimination and an increased sensitivity to touch and pain in the lower portion of this stage.

40. Gray, T. C., and Halton, J. Milestone in Anesthesia? (d-Tubocurarine Chloride). *Proc. Roy. Soc. Med.* 39:400 (May) 1946.

41. Paulson, J. A., Lundy, J. S., and Essex, H. E. Narcosis With Pentothal Sodium Alone Compared to Narcosis With Pentothal Sodium Combined With (1) Curare or (2) Myanesin. *Anesthesiology* 10:387 (July) 1949.

42. Etsten, B., and Himwich, H. E. Stages and Signs of Pentothal Anesthesia: Physiologic Basis. *Anesthesiology* 7:536 (Sept.) 1946.

STAGE II. HYPERSENSITIVITY—This stage is not seen after rapid induction. It actually begins with loss of consciousness. Since there is already a depression of the activities of the hypothalamus and the subcortical motor nuclei, only sensitivity to pain remains. A painful stimulus will elicit a hyperactive response demonstrated by exaggerated movements of the arms and legs. These involuntary reactions immediately subside when the stimulus is withdrawn. The pupils gradually become smaller, and eyeball movements become involuntary.

STAGE III. SURGICAL ANESTHESIA—

Plane I. Light surgical anesthesia. Further cerebral depression occurs, and only a minimal response to severe pain will be demonstrated. Minor surgical procedures can be performed here. The eyelid reflex disappears.

Plane II. Moderate surgical anesthesia. Muscular response to pain is abolished, but pupillary dilatation and respiratory changes are still evoked with severe pain because the midbrain, although depressed, still functions. When the patient is not stimulated, the pupils are constricted and do not react to light while the eyeballs become fixed and centrally placed.

Plane III. Deep surgical anesthesia. The midbrain becomes increasingly depressed with the accompanying loss of pupillary and respiratory responses to stimuli.

STAGE IV. IMPENDING FAILURE—There is no response to pain. The predominant signs are extreme respiratory depression and diminished pulse pressure. Pupillary dilation, if present, is due mainly to cerebral anoxia. This stage is a warning sign that further increase in depth of anesthesia will suppress the vital centers and lead to medullary failure.

Respiratory activity is not always indicative of depth of anesthesia. Respiratory arrest can occur in light anesthesia from too rapid administration of thiopental sodium and is usually temporary in this instance. If apnea occurs in the later stages (II, III and IV), it becomes prolonged because the respiratory centers are depressed and deprived of metabolic support. Respiratory rate and rhythm are usually normal until the second plane of the third stage, when a decrease in amplitude and an increase in rate occur. Pulmonary exchange becomes so depressed in the fourth stage that anoxic anoxia is superimposed on the existing histotoxic anoxia, increasing the handicap on the brain and eventually resulting in apnea.

The pulse rate remains constant throughout anesthesia unless anoxia or carbon dioxide accumulation occurs, and then the rate increases.

■ *Comment*

Ausherman and Crawford[43] state that the ease of administration of thiopental sodium can often be considered a disadvantage, since it frequently prompts unskilled persons to attempt its use without considering the necessary adequate research and study relative to its administration. Thiopental sodium has been condemned as a dangerous drug for anes-

43. Ausherman, H. M., and Crawford, O. B. Uses of Pentobarbital Intravenously. *Postgrad. Med.* 8:287 (Oct.) 1950.

thesia, but that danger is actually a result of lack of knowledge of the pharmacology of the drug or a result of lack of skill in its administration. Everson's[20] declaration that "the safety of an anesthetic is in direct proportion to the skill of the anesthetist" cannot be overemphasized.

■ *Summary*

A comprehensive review of the history, pharmacology, and the technics and procedures incident to the safe administration of thiopental sodium as an intravenous anesthetic is presented. The advantages of using thiopental sodium as an induction agent in combination with a mixture of nitrous oxide-oxygen demonstrate the effect of synergists in producing "balanced anesthesia." The safety of thiopental sodium as a general anesthetic is primarily dependent on the knowledge, training and skill of the anesthetist, and in competent hands there are definite advantages to its use in oral surgical procedures performed in the office.

Control of postoperative nausea with the use of dimenhydrinate

■ *Alvin L. Armer, D.D.S., Hollywood, Calif.*

It has been thought that postoperative nausea following general anesthesia is caused by disturbed equilibrium. Therefore, when dimenhydrinate (Dramamine[1]) was released, it was felt that it might prevent this condition.

In this investigation the patients were not informed about the drug or the reason for its administration as it was felt that this information might influence the results of the study.

The patients were all ambulatory and the oral surgical procedures were performed in the office under 2 per cent thiopental sodium anesthesia. The length of anesthesia varied from three to 45 minutes.

The drug was administered both orally and parenterally. In those instances in which dimenhydrinate was administered orally 100 mg. was given the patient at a time corresponding with the two meal hours preceding the operation. In those instances in which the dimenhydrinate was administered parenterally 50 mg. was injected when the anesthetic was given.

The patients were divided into three

1. Dramamine supplied by G. D. Searle & Company.

groups. The first group consisted of 117 patients who had no history of motion sickness such as is produced by air, sea and car travel. The second group consisted of 157 patients who had histories of motion sickness. Seventy-one patients in this group were administered dimenhydrinate orally. Eighty-six patients were administered the drug parenterally. The third group consisted of 56 patients each of whom had a history of motion sickness and also a history of nausea following thiopental sodium anesthesia. Thirty-one patients in this group were administered the drug orally. Twenty-five patients were administered the drug parenterally. Four patients in the first group developed nausea. Eight patients in the second group, three of whom had received the drug parenterally, became nauseated and seven patients in the third group were affected similarly.

By way of control, approximately the same number of patients with similar histories were anesthetized without having been treated with dimenhydrinate. Of 117 patients in control group one, eight developed nausea. Fifty-one of the 150 patients in control group two developed nausea and 17 of the 50 patients in control group three were similarly affected. Our initial experiment indicates that the use of dimenhydrinate orally, parenterally or in the form of suppositories reduces the incidence of postoperative nausea. Further investigation and observation should be continued.—*6331 Hollywood Boulevard.*

Myoblastoma of the buccal mucosa

■ S. S. *Fabe, D.D.S., Los Angeles, Calif.*

Myoblastoma was first described by Abrikossoff,[1] in 1926, as a tumor of myoblasts occurring chiefly in relation to striated muscle. Gray and Gruenfeld[2] did extensive research on myoblastomas, describing the tumors in the tongue, chest and breast. Hunt and Warren[3] described cases of myoblastoma of the arm, buttock, chest and neck. Bernier[4] discussed myoblastoma in general. Kerr[5] reported 9 cases of myoblastoma: 6 of the tongue, 1 of the alveolar ridge, 1 of the thigh, and 1 of the lip.

Myoblastoma of the buccal mucosa is uncommon. The common sites are the

1. Abrikossoff, A. J., Ueber Myome ausgehend von Quergestreiften willkürlichen Muskulature. *Arch. Path. Anat.* 13: 470, 1926.
2. Gray, S. H., and Gruenfeld, G. E., Myoblastoma. *Am. J. Cancer* 30:699 (Aug.) 1937.
3. Hunt, C. W., and Warren, S., Myoblastoma. *Surgery* 26:319 (Sept.) 1949.
4. Bernier, J. L., Myoblastoma *Am. J. Orthodont. & Oral Surg. (Oral Surg. Sec.)* 33:548 (July) 1947.
5. Kerr, D. A., Myoblastic Myoma. *Oral Surg., Oral Med. & Oral Path.* 2:41 (Jan.) 1949.

tongue, larynx and skin, but myoblastoma has also been found in the upper part of the esophagus and on the leg. It consists of polygonal cells with highly granular cytoplasm. In addition, there may be ribbon-like syncytial masses with granular cytoplasm. No cross striations are seen.

These are essentially benign tumors and must be differentiated from rhabdomyoma, which is a benign tumor of striated muscle. A rhabdomyosarcoma is a rare malignant tumor, being practically confined to the heart, whereas myoblastoma is found in other areas.

■ *Report of Case*

A white woman, aged 51, was referred because of a large nodule in the upper left buccal mucosa. It had been present for three years. Examination showed the oral tissues to be of normal color and tone. Lateral to the mucobuccal fold on the left was a tumor, approximately 2.25 cm. long and 1.5 cm. wide (Fig. 1). Palpation revealed the mass to be firm and nodular; it was covered by eroded and slightly grayish mucous membrane.

Roentgenograms of the teeth and alveolar ridge revealed no pathologic changes.

Thiopental sodium was administered intravenously, and the tumor was excised with a 2 mm. margin of normal mucous membrane. This procedure was performed in the dental office. The wound was packed with iodoform gauze for a few days and healed without incident.

■ *Histologic Examination*

GROSS EXAMINATION—The specimen consisted of an oval portion of mucous membrane and submucosal tissue, 1.9 by 1.2 cm. in transverse diameters and 0.7 cm. in maximum thickness. The mucosal surface was occupied by an opaque tan elevation 1.4 by 0.8 cm. in transverse diameters. One margin of the elevation was thick and granular, while the opposite margin blended with the regional mucosa. Section revealed firm, faintly mottled, yellowish gray tissue.

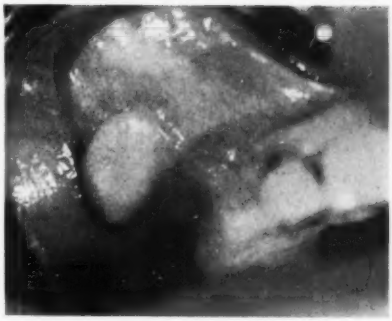


Fig. 1.—The tumor as it appeared when first viewed

MICROSCOPIC EXAMINATION — The surface epithelium was somewhat variable in thickness, showing regular, orderly proliferation in the granular area described grossly (Fig. 2) but was otherwise not remarkable. Beneath the epithelium and occupying the full thickness of material sectioned was a circumscribed unencapsulated collection of large, round to oval cells containing abundant eosinophilic cytoplasm (Fig. 3). The latter showed extreme granularity. The tumor cells were regular in size and shape. Nuclei were small and showed no hyperchromatism or mitotic activity. A few lymphocytes were present in several areas.

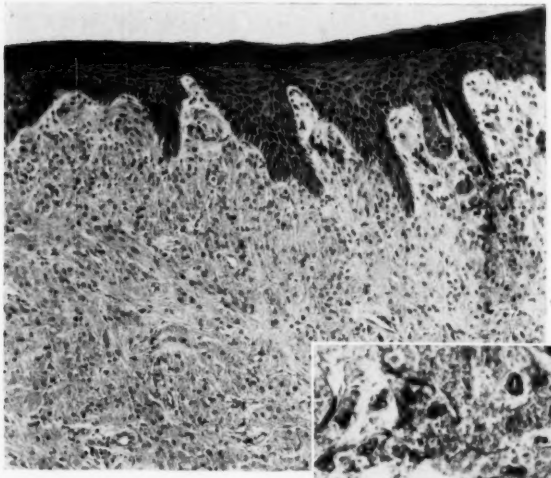
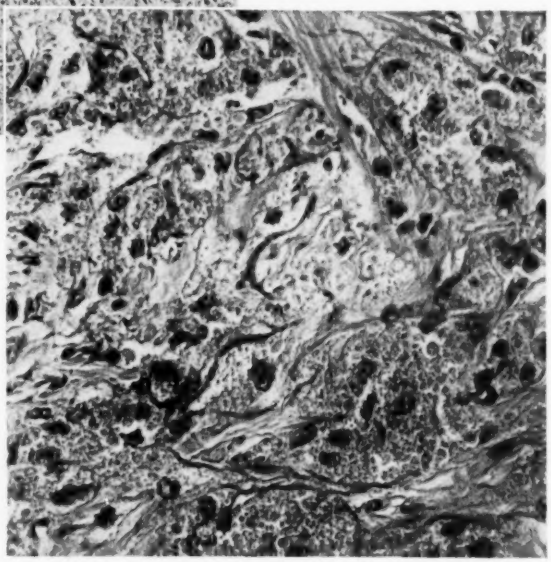


Fig. 2.—Left: Low power (× 60) photomicrograph of the myoblastoma. The tumor is covered by hyperplastic squamous epithelium



Right: High power (× 200) photomicrograph of the myoblastoma. The tumor cells are large and have abundant granular cytoplasm

DIAGNOSIS—The diagnosis was granular cell myoblastoma.

■ *Summary*

A myoblastoma was removed from the buccal mucosa. This is an uncommon site for such lesions, since they are usually found in the tongue, legs and chest. These lesions are benign but must be differentiated from malignant neoplasms by microscopic examination.—*6351 Wilshire Boulevard.*

Osteoperiosteal flap for operation of large tumors and cysts of the jaw

■ *Sanford M. Moose, D.D.S., San Francisco*

Any procedure that will expedite the physiologic filling and regeneration of large bone cavities following operation is desirable. Numerous procedures have been advocated in the management of large wounds. Many surgeons believe that blood clots formed in large cavities cannot remain completely vital but invariably become septic. Because of this belief, they immediately initiate postoperative treatment by filling the wound with blood clot displacing material such as medicated gauze, absorbable cellulose or a nonantigenic absorbable sponge. Some surgeons claim certain value from the use of these agents in postoperative bone cavities but others question their value and have expressed disappointment in the results obtained.[1-7]

The author has found that the beneficial results attributed to the employment of these agents have been obtained in similar cases without their use. Furthermore, the insertion of a foreign substance into an oral wound increases the probability of contamination.

If the blood is allowed to flow uncontrolled into a large bone wound, a blood clot may become a hematoma and increase in dimension beyond the optimum contour of the jaw. This condition may be prevented by the use of tension sutures, pressure compresses or splints. Pressure compresses may be employed in the form of intraoral splints or extraoral pressure dressings. Large wounds on the facial surface of the maxilla or mandible can be compressed easily for the first 12 hours by extraoral pressure bandages. Excessive bleeding in palatal or lingual wounds can be controlled by plastic or malleable wire splints placed over the flap. Malleable wire splints can be used only where teeth are present, otherwise, plastic prefabricated splints may be employed.

In devising a method which will expedite the regeneration of bone in large postoperative cavities the physiology of bone repair must be considered. Osteogenesis, whether in the repair of fractures, the regeneration of extraction wounds, or in the filling of large bone cavities caused by the removal of tumors or cysts, undergoes basically the same process. Wein-

Clinical professor of oral surgery, College of Physicians and Surgeons, School of Dentistry, San Francisco.

1. Queries and Comments. *J. Oral Surg.* 7:266 (July) 1949.

2. Queries and Comments. *J. Oral Surg.* 8:74 (Jan.) 1950.

3. Seegers, W. H., and Sharp, E. A., *Hemostatic Agents.* Springfield, Ill.; Chas. C Thomas, 1948, p. 88.

4. Gotthoffer, N. R., *Gelatin in Nutrition and Medicine.* Grayslake, Ill.: Grayslake Gelatin Co., 1945, p. 81-86.

5. Silverman, L. M., Investigation of Gelatin Sponge with Thrombin and Penicillin in the Treatment of Oral Surgical Wounds. *Oral Surg., Oral Med. & Oral Path.* 2:260 (Feb.) 1949.

6. Thoma, Kurt H., and Sleeper, E. L., Gelatin Sponge in the Obliteration of Cavities Resulting from the Excision of Cysts or Tumors of the Jaw. *Oral Surg., Oral Med. & Oral Path.* 1:24 (Jan.) 1948.

7. Guralnick, W. C., Absorbable Gelatin Sponge and Thrombin in Oral Surgery. *Am. J. Orthodont. & Oral Surg. (Sec. Oral Surg.)* 32:792 (Dec.) 1946.

mann and Sicher[8] state that the steps in the healing of an empty socket are in principle the same as in the healing of a fracture. These steps are:

1. Formation of a blood clot filling the socket.

2. Organization of the blood clot by proliferating young connective tissue.

3. Reconstruction of this region of the alveolar process by resorptive activity on the one side and the replacement of the immature bone by mature bone on the other.

In considering the repair or regeneration of bone in larger bone wounds, the words bony cavity need only be substituted for socket or alveolar process.

Protection and immobilization of the blood clot is imperative to permit the early, orderly invasion of the clot by proliferating cells of juvenile connective tissue. Bone grafts, bone chips, bone paste, cancellous bone, cartilage, ivory or calcium salts have all been used to supply a matrix for bone regeneration in large cavities. Regeneration following the introduction of foreign substances into bone cavities is not the result of utilization of these elements but rather the result of stimulation produced by the implanted material on the juvenile connective tissue. This stimulation is known as the osteogenetic factor.

The autoplastic bone graft with its periosteal covering is the one most likely to be successful. This fact is the basis for the method of flap preparation discussed here. I favor the inclusion of the osseous wall beneath the mucoperiosteum and its retention to its mucoperiosteal covering during the elevation and replacement of the flap.

This method can be employed in the treatment of the type of tumor covered by a compressible facial, lingual or palatal wall of bone similar in palpable response to the covering of a ping-pong ball. Most technics for the removal of large cysts and tumors include incision through the mucoperiosteum, elevation of the soft tissues and removal of the bone overlying the tumor. In contrast the author now employs the following method. Incision is made through the mucoperiosteum and cortex of bone overlying the tumor or cyst. In many of these cases the cortical plate of bone is so thin that it will permit incision with the scalpel simultaneously with the incision of the mucoperiosteum. If, however, the cortical plate of bone is too resistant to permit incision with the scalpel, an incision is made through the mucoperiosteum and immediately thereafter the bone is incised with chisels. After the entire incision of the osteomucoperiosteum, the inclusive flap is elevated and reflected permitting the exposure of the operative field. The most satisfactory flaps are made with a mesial and distal incision, joined by an incision along the gingival or alveolar crest. There are times when it is undesirable to disturb the gingival margin or alveolar third of the jaw. In these instances semilunar incisions are made at a safe distance from the affected region. The site of palatal flaps can be chosen with respect only to the circulation. Flaps on the lingual surface of the mandible may be unsuccessful if the lingual mucoperiosteum is violated any place below the gingival or alveolar crest.

8. Weinmann, J. P., and Sicher, Harry. *Bone and Bones.* St. Louis: The C. V. Mosby Co., 1947.

Inadequate circulation, mobility of the tongue and friability of the lingual mucoperiosteum, may contribute to unpleasant sequelae and delayed healing.

After removal of the cyst or tumor, the osteomucoperiosteal flap is returned to its original position and sutured. This type of flap, with its bony lining adherent to the mucoperiosteum, adds stability and increases the osteogenetic surface of tissue surrounding the blood clot. The added rigidity imparted to such a flap by its adherent bone increases its clot splinting property and usually obviates the necessity for additional splints.

While elevating and reflecting the osteomucoperiosteal flap a fracture, or multiple fractures, may occur at the base as well as within the mass of the flap. Such fractures do not influence the efficiency of the flap in any way and only fragments of the bony wall which are devoid of mucoperiosteal flap attachment are discarded.

The employment of this procedure expedites the regeneration of bone in large wounds. The use of this type of flap has materially decreased the bone regeneration time. The postoperative care and treatment involves only observation, as in practically all the instances where this modification of surgical technic has been employed, the patients have had uneventful recoveries.

Erythema nodosum of dental origin

■ *Adrian L. Almquist, D.D.S., Valentine, Neb.*

Erythema nodosum is a specific lesion characterized by circumscribed indurated erythematous areas on the extensor surfaces of the legs and forearms. The lesions may also occur on the buttocks. They are extremely painful and tender and soon assume a purplish and then a yellowish color; they disappear after several days or weeks. They may recur in crops.[1] The eruption of erythema nodosum consists of poorly defined nodular lesions varying in diameter from a few millimeters to 5 or 6 cm. The skin over the nodules is smooth, shiny and generally of a rose red color. Ulceration seldom takes place.[2]

Erythema nodosum has no specific cause. Almost any infectious disease may produce the condition. Outstanding causes are rheumatic fever, tuberculosis, syphilis and infections caused by the gonococcus

1. Meakins, J. C., *The Practice of Medicine*, ed. 4. St. Louis: C. V. Mosby Co., 1944, p. 1,321.

2. Cecil, R. L., editor, *A Textbook of Medicine* by American Authors, ed. 5. Philadelphia: W. B. Saunders Co., 1942, p. 519-520.

and meningococcus.[2] Nonspecific streptococcic infections may also give rise to it, but it is most commonly associated with rheumatic fever or tuberculosis.

The eruption usually is preceded by mild constitutional symptoms, such as fever, malaise and pain in the muscles and joints, and may be accompanied by definite polyarthritis.[2]

Emphasis should be placed on discovering the causative factors and removing them. Salicylates and codeine with acetylsalicylic acid are useful when pain accompanies the eruption. The use of simple dusting powders, weak solutions of sodium bicarbonate, alcohol or boric acid will relieve the local irritation. If the infection is due to a streptococcus or gonococcus, the use of penicillin is indicated.

■ *Report of a Case*

A white woman, aged 39, was referred to the dental office for oral examination. The oral cavity contained 24 teeth. The arches of the upper and lower jaws were normal. The mucous membranes and oral tissues except for the gingiva were normal. An advanced stage of periodontal disease was present with recession of the labial gingiva and excessive calculi deposits. Except for the gingival bone destruction, roentgenographic study of the mouth of the patient revealed no significant abnormalities.

■ *Medical Examination*

Medical examination revealed painful nodules on the legs, with no history of injury or recent respiratory infection. The familial history disclosed no tuberculosis, rheumatic fever or other significant conditions. The Wassermann reaction was negative. Chest roentgenograms and sputum examination were both negative. The patient did not have a present or past history of gonorrhea. The blood cell count revealed 76 per cent hemoglobin, 4,630,000 erythrocytes and 10,800 leukocytes. The temperature was 99.2° F; the urine was normal, and all other medical findings were normal.

■ *Treatment*

A complete scaling was done first. Then all the teeth were removed, because of the advanced periodontal disease. This was accomplished in four sittings. The patient suffered an acute exacerbation each time teeth were removed.

■ *Summary*

Erythema nodosum in itself is not a serious event. There is no specific cause. It may be caused by oral sepsis as shown in the reported case. At the time of writing, three years after the teeth were removed, there had been no recurrence. A nonspecific streptococcus was probably causative.—*239 Main Street.*

■ PEACE OF MIND

"This is the gift that God reserves for His special proteges," he said. "Talent and health He gives to many. Wealth is commonplace, fame not rare. But peace of mind He bestows charily."—*Joshua Loth Liebman, "Peace of Mind."*

Renal osteodystrophy with oral manifestations

■ *Irwin Lighterman, D.D.S., New York*

Renal osteodystrophy, renal rickets or renal osteonephropathy,[1,2] is a rare pathologic condition. The disease is believed to be associated with chronic renal insufficiency caused in some cases by a congenital defect in the renal tubules. Renal insufficiency is observed also in chronic glomerulonephritis, polycystic kidneys and obstructive lesions of the urinary tract.[3] Weinmann and Sicher[4] state that renal hypoplasia and pyelonephritis are also causative factors. The syndrome of renal osteodystrophy results as the diseased kidney is unable to form ammonia, and a disturbed acid-base balance with lowered pH follows. This impaired renal function is followed by several abnormal physiologic reactions:

1. Hyperphosphatemia.

2. Increased renal excretion of calcium and hypocalcemia. Hypocalcemia often leads to tetany and reflex hyperirritability.

3. Hypertrophy of the parathyroid glands with increased parathormone secretion. This tends to bring about a more normal serum calcium level and to decrease the serum phosphorus. Cecil[5] states the belief that the serum calcium level often returns to normal under the influence of increased parathormone.

4. In response to the increased parathormone secretion, calcium is mobilized from the skeletal system.

5. With the withdrawal of calcium from the skeletal system, bone lesions develop which resemble those of hyperparathyroidism such as are seen in adults in osteitis fibrosa cystica and osteoporosis or rickets in children—hence the name renal rickets.

A further complication that develops is a decreased absorption of calcium from the gastrointestinal tract. Grollman[2] attributes this to acidosis, since calcium absorption is inhibited in an acid medium. Moore[6], on the other hand, maintains that, as a result of hyperphosphatemia, lesser phosphate is absorbed from the intestine and is excreted. This author reasons further that, in the process of excretion, the calcium is carried along with the phosphate.

In differential diagnosis between hyperparathyroidism and renal osteodystrophy, Thoma[3] makes the following observations:

1. Kidney insufficiency is frequently a feature of hyperparathyroidism.

2. Hyperparathyroidism is frequently a secondary complication of renal disease.

From the Department of Oral Surgery, Hospital for Joint Diseases, New York.

1. Rule, C., and Grollman, A., Osteo-nephropathy: A clinical Consideration of So-Called "Renal Rickets." *Ann. Int. Med.* 20:63 (Jan.) 1944.

2. Grollman, A., *Essentials of Endocrinology*, ed. 2. Philadelphia: J. B. Lippincott Company, 1947.

3. Thoma, K., *Oral Pathology*, ed. 3. St. Louis: C. V. Mosby Co., 1950.

4. Weinmann, J. P., and Sicher, H., *Bone and Bones*. St. Louis: C. V. Mosby Co., 1947.

5. Cecil, R. L., editor, *A Textbook of Medicine by American Authors*. Philadelphia: W. B. Saunders Co., 1943.

6. Moore, R. A., *A Textbook of Pathology*. Philadelphia: W. B. Saunders Co., 1944.

Table 1
Blood chemistry

	3-11-49	5-10-49	7-20-49	9-26-49	10-26-49	12-6-49	2-18-50	2-20-50	2-22-50
Sugar (90-120 mg.)	89.0					109.0			
Nonprotein nitrogen (15-35 mg.)	29.0				49.0	42.0	74.0	145.0	325.0
Calcium (9-11 mg.)	6.5	7.6	6.8	8.7					
Inorganic phosphorus (3-4 mg.)	4.3					3.1			
Alkaline phosphatase (1.5-4 units)	4.6					4.7			
Cholesterol (150-200 mg.)						156.0			
Free cholesterol (28-30 mg.)						30.0			

*Normal values are shown in parentheses.

3. Primary hyperparathyroidism is distinguished by a change or enlargement of one or sometimes two parathyroid glands, usually denoting the presence of a neoplasm.

4. Hyperparathyroidism secondary to renal insufficiency is marked by enlargement of all of the parathyroid glands, denoting overactivity.

Thoma[3] further states that roentgenographic evidence of renal osteodystrophy affecting the jaws is not seen in all instances. Histologically, the normal bone is replaced with the coarse fibrillar type of spongy bone. Osteoclastic resorption and fibrosis of the bone marrow are further characteristics.

■ *Report of Case*

A well-developed 23 year old white man was admitted to the medical service of the Hospital for Joint Diseases for a general check-up on December 5, 1949. The patient was in no acute distress but was rather nervous and perspired profusely. Except that the hair, which began falling out at the age of 16, was thin, no ectodermal changes were evident. The family history was essentially noncontributory.

At the age of 6, the patient had had an attack of tetany. He also had had the usual childhood diseases. His physician at that time stated that he had idiopathic hypertension. Since then he had had re-

Table 2
Blood differential

Date	Hemoglobin %	Red blood count	White blood count	Seg.	Eosinophils	Lymphocytes	Monocytes
3-11-49	13.5	4,940,000	6,900	51	2	44	3
10-26-49	14.5	5,000,000	7,400	66	8	26	—
12-5-49	15.0	4,800,000	8,300	66	—	29	5

peated attacks of tetany with symptoms of tingling about the face and lips and stiffening of the hands. These attacks usually were associated with emotional excitement. During the later years he occasionally had felt faint and his hands had felt numb, but he was free from other disturbances. Furthermore, he had had periodic low back pain. An operation to correct "knock knees" had been performed during the preadolescent period. Current examinations revealed no diabetes or heart or venereal disease.

In June, 1949, a diagnosis of idiopathic hypoparathyroidism and idiopathic hypertension was made. The patient was given dihydrotachysterol therapy. This drug, which has the properties of parathormone, is prescribed in cases of hypoparathyroidism and hypocalcemia for maintenance of a normal blood calcium level.[7]

After this treatment, the patient felt

7. Goodman, L., and Gilman, A., *The Pharmacological Basis of Therapeutics*. New York: Macmillan Company, 1941.

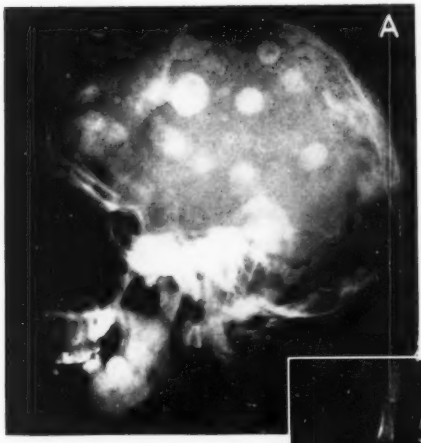


Fig. 1.—A: Lateral view of the skull disclosing stippling of the vault, which is somewhat increased in thickness. Scattered through the stippling are round circumscribed densities. This picture is sometimes seen in hyperparathyroidism secondary to renal disease

B: Both hands show moderate osteoporosis

Fig. 2.—Left lateral portion of the mandible

Fig. 3.—Right lateral portion of the mandible

generally well and there was no further recurrence of tetany; all reflexes, however, were hyperactive. The physician in charge then suggested that a warm climate would probably be beneficial to him.

He was admitted to the hospital for re-examination. The following findings were noted: The Mazzini test was negative; hypertension was marked; the systolic pressure varied but was in the main over 200; on one occasion a pressure of 260/160 was recorded. Because of the previous reports of hypocalcemia and recurrent attacks of tetany, the diagnosis was hypoparathyroidism and idiopathic hypertension.

The laboratory reports are recorded in Tables 1 and 2. Roentgenographic findings are shown in the illustrations. Pyelograms disclosed no significant abnormalities. Urinalysis in March, 1949, showed a specific gravity of 1.010, an acid reaction, a trace of albumin, no sugar, and some red but few white cells. Renal concentration ascertained at two different times indicated specific gravity of 1.010 and 1.001 respectively.

Although there were no dental complaints, as part of a complete physical examination the patient was referred for a dental consultation. Oral examination revealed that several teeth had been lost, some were carious and the occlusion was within normal limits. The soft tissues were normal. The regional lymph nodes were not palpable.

Roentgenograms of the skull and hands (Fig. 1) had been made on a former occasion. The roentgenograms at this time were made of the dental areas and lateral mandibular plates. Mandibular plates of both sides showed some bony changes suggesting moderate osteoporosis, best seen at the angles of the jaw, and some diffuse rarefaction in the horizontal ramus (Fig. 2 and 3). The roentgenograms of the dental areas showed that the lamina dura was either lacking or ab-

normally thin. Also, the periodontal membrane was abnormally thin or apparently lacking, so that the tooth structure appeared to be directly apposed to the surrounding bone. The alveolar bone itself presented a generalized "ground glass" appearance (Fig. 4 and 5).

A protracted history of tetany is usually associated with low serum calcium and hypoparathyroidism. These roentgenographic findings, however, were suggestive of osseous changes such as are seen in hyperparathyroidism.

The roentgenographic findings were brought to the attention of the physician in charge. Roentgenograms of the skull and hands (Fig. 1) showed similar changes, on the basis of which a diagnosis

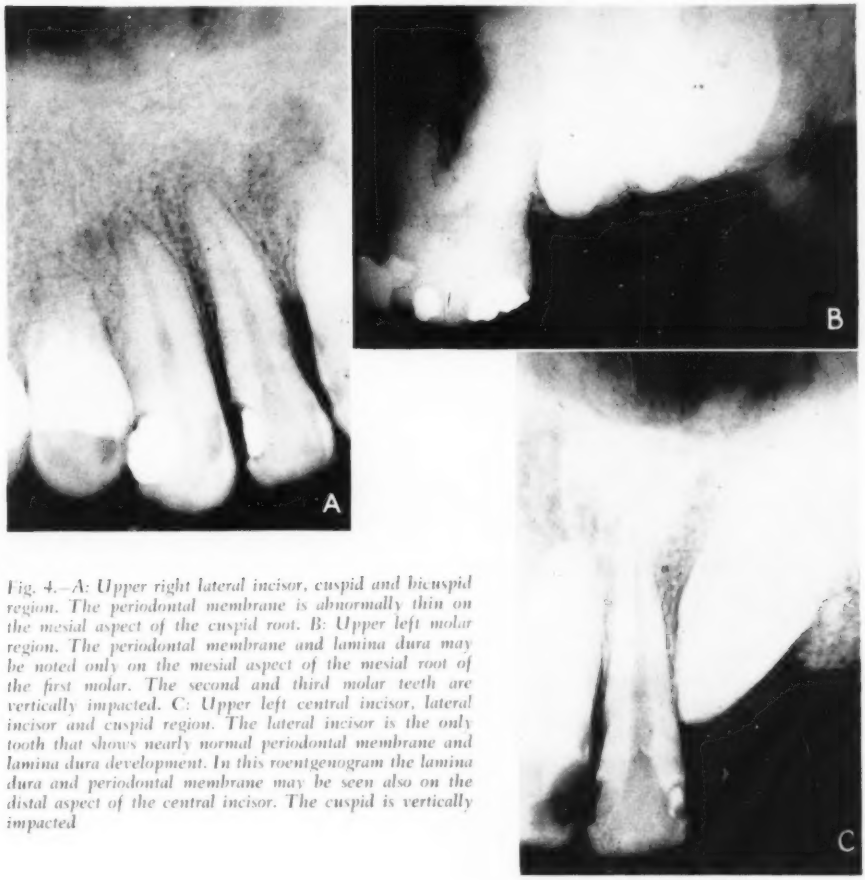


Fig. 4.—A: Upper right lateral incisor, cuspid and bicuspid region. The periodontal membrane is abnormally thin on the mesial aspect of the cuspid root. B: Upper left molar region. The periodontal membrane and lamina dura may be noted only on the mesial aspect of the mesial root of the first molar. The second and third molar teeth are vertically impacted. C: Upper left central incisor, lateral incisor and cuspid region. The lateral incisor is the only tooth that shows nearly normal periodontal membrane and lamina dura development. In this roentgenogram the lamina dura and periodontal membrane may be seen also on the distal aspect of the central incisor. The cuspid is vertically impacted

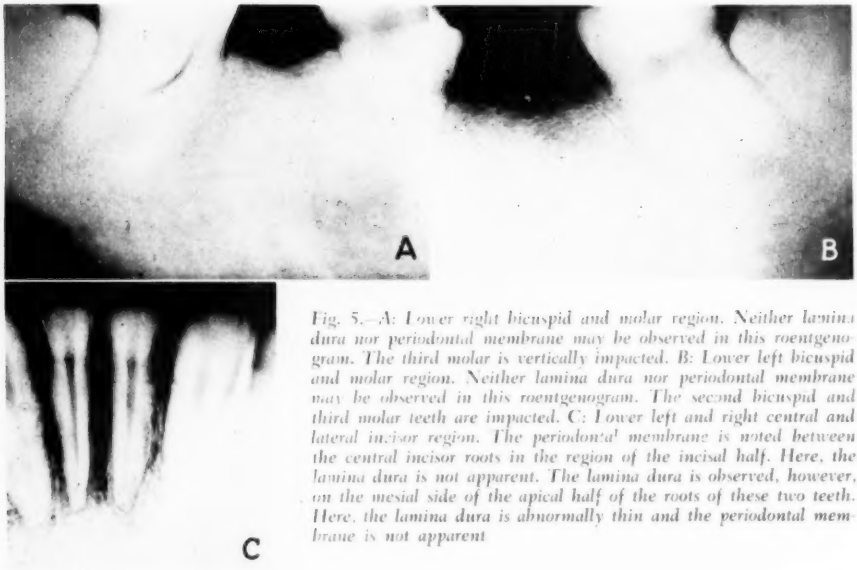


Fig. 5.—A: Lower right bicuspid and molar region. Neither lamina dura nor periodontal membrane may be observed in this roentgenogram. The third molar is vertically impacted. B: Lower left bicuspid and molar region. Neither lamina dura nor periodontal membrane may be observed in this roentgenogram. The second bicuspid and third molar teeth are impacted. C: Lower left and right central and lateral incisor region. The periodontal membrane is noted between the central incisor roots in the region of the incisal half. Here, the lamina dura is not apparent. The lamina dura is observed, however, on the mesial side of the apical half of the roots of these two teeth. Here, the lamina dura is abnormally thin and the periodontal membrane is not apparent

of renal osteodystrophy, or renal rickets, was made. No further study could be made, as the patient requested discharge and left the hospital on December 9, 1949.

The patient went to Florida, where he remained well until February 18, 1950. He then began to have pain in the lower right abdominal quadrant. He was admitted to a hospital, where the diagnosis of acute appendicitis was made. Numerous petechiae were noted on both shins at admission. The urine studies, blood pressure and eye grounds were suggestive of uremia. The appendix was removed. The postoperative period was stormy. The nonprotein nitrogen increased steadily and reached extremely high levels (Table 1). The patient died on the sixth postoperative day. The postmortem diagnosis was generalized peritonitis due to terminal ileitis associated with uremia. A complete autopsy report was not available.

■ *Summary and Comment*

A brief review of the disease known as renal osteodystrophy is presented with a case report. The case is of interest because for years the hypocalcemia and recurrent attacks of tetany beclouded the true nature of the ailment. It is also notable that the osseous changes in the alveolar bone and mandible as disclosed by the roentgenograms gave the clue to a more accurate diagnosis. It should be mentioned that, as in this case, chronic renal insufficiency may be present even though the pyelogram is normal.—*90 Riverside Drive.*

Alveolectomy

■ *Karl Hayden Wood, Ph. G., D.D.S., Washington, D. C.*

Articles on alveolectomy have been found in dental literature dating back as long as 100 years. Seldom does a month pass that some article regarding this subject is not published. All these articles seem to be more or less in agreement regarding the methods employed. Willard,[1] as long ago as 1853, had a rather modern concept of this operation. He stated:

> After the extraction of teeth, I clip off all the mucous tissue that fills the space between the teeth, leaving a smooth border. I then dissect back the fibrous mucous tissue from the alveolar wall, or border, about one-quarter to three-eighths of an inch deep. This will allow the edges of the mucous tissue to come together, having the appearance of a cut only around the dental arch. I believe that I have saved much suffering and much inflammation, and also natured the task of removing this same matter by absorption or effusion. By this process, gums soon become hard and firm.

In 1876, W. George Bearse, of Montreal, Canada, advised the judicious trimming of prominent alveolar processes after the removal of teeth.

Shearer[2] was also a pioneer in this operation. He stated recently:

> When I designed alveolectomy in 1904 and made the first operation in 1905, Dr. D. E. Jenkins, president and founder of the University of Omaha, named the operation "External Alveolectomy." Then one day while he was watching the work, he remarked, "Dr. Shearer, you round off the back side of the jaw too." I said, "Yes, otherwise I would create a pathological condition." "Then," he said, "I have misnamed the operation. We shall take off the word 'External' and name it 'Alveolectomy' and 'Partial Alveolectomy.' These names I think will live to stand the test of time."

■ *Description of the Alveolar Bone*

The alveolar process has the same characteristics as true bone and is supplied with a complete haversian system. The variations from normal, such as hypocalcified bone and hypercalcified bone, can be studied best by roentgenograms. When viewed on the roentgenograms, the type of trabeculae and shade of bone are indicative of the density of the bone. Heavy trabeculae and dark shades indicate hypocalcified, or thin, bone, while thin trabeculae and light shades indicate hypercalcified, or dense, bone. Normally, one may expect bone changes to follow the removal of teeth, and these changes influence the size and shape of the ridges. A normal amount of resorption is not only to be expected but desired, as it allows sufficient space for dentures. Sometimes, however, for various reasons, there may be an overgrowth of the alveolar process

Presented before the Section on Oral Surgery, ninety-second annual session of the American Dental Association, Washington, D. C., October 17, 1951.

Chief, department of oral surgery, George Washington University Hospital, and associate in dental surgery, George Washington University, Washington, D. C.

1. Willard, A. T., Preparing the Mouth for Full Sets of Artificial Teeth. *Dental News Letter* 6238, July, 1853, Chelsea, Mass.

2. Shearer, W. L., Personal communication, 1951.

of bone, or the opposite may be the case, resulting in almost flat ridges. In either case, the effect is undesirable and the prosthodontist is confronted with a vexing problem. It is at this point that the oral surgeon is asked to attempt correction. The oral surgeon, therefore, should have a knowledge of the character of bone with which he is dealing, for, if he knows the type of bone, he will be forewarned of any difficulties that have to be surmounted in the operation.

■ *Preoperative Consultation with Patient*

In a complete alveolectomy, especially when a large area of the anterior portion of the ridge is to be removed for esthetic reasons, there should be a consultation with the patient prior to the regular appointment for surgery. At this time, the oral surgeon should determine the physical condition of the patient, discuss and explain the operation to him, and let him know the results he expects to obtain. He should also observe the prominent protrusion and tuberosities and form a mental picture of the amount of surgery necessary to reduce the ridges. A full mouth roentgenographic survey should be made at this time, which will show the type of alveolar process with which he will be dealing and reveal any pathologic tissue remaining in the process, as well as any retained root fragments. It will also show the proximity of the antrum and canals and, if any teeth are present, the extent of periodontal involvement, if any. Bearing all this in mind, it is possible to appreciate the advantages gained through the use of roentgenograms to determine beforehand what the problem may be. The pioneers in this field were without this benefit.

The oral surgeon should have study models and should discuss the operation and go over the models with the prosthodontist, if a complete alveolectomy is to be performed. In this manner, the surgeon will have a complete understanding as to what is expected of him in any particular case. If the alveolectomy is to be followed by the immediate insertion of the denture, then the oral surgeon should trim the models himself, which will help him to know exactly how much bone is to be removed and what the result is going to be.

However, some prosthodontists prefer to trim their own denture models prior to surgery. If so, they should then provide the oral surgeon with a clear, acrylic baseplate, made over the corrected model, which is employed as an accurate guide as to the exact location of the desired bone surgery. The clear, acrylic baseplate is held on the dental ridge with pressure, and the bone is trimmed under the tissues that are blanched by the pressure of this baseplate.

■ *Indications for Alveolectomy*

Some of the reasons for performing alveolectomy are as follows: (1) to remove abnormally long and prominent ridges, (2) to correct faulty occlusion, (3) to correct anatomic abnormalities, (4) to improve esthetics, where anterior protrusion exists, (5) to permit a better balanced denture by removing large tuberosities and undercuts, (6) to eliminate protuberances, such as tori, (7) to eliminate protruding areas in the mouth where teeth have been removed a few at

a time, over a long period, (8) to eliminate sharp razor-edge ridges, (9) to eliminate sharp mylohyoid ridges, (10) to remove pathologic areas, such as granulomatous areas and retained root tips or (11) to trim bone when the alveolar process has been fractured at the time of a previous extraction.

■ *Suggested Methods*

Because one or more of these conditions are often found to exist at the time of oral surgery, it is necessary to employ one of several methods for correction. The method used will depend greatly on the extent of the operation contemplated. Suggested methods are (1) labial alveolectomy, (2) complete alveolectomy in edentulous mouths, (3) complete alveolectomy at the time of the removal of the remaining teeth and (4) partial alveolectomy following the simple removal of individual isolated teeth.

In addition to bony abnormalities, the oral surgeon may find soft, flabby and hypertrophied tissue, which should be removed at the time of the alveolectomy. Any muscle attachments that might interfere with the denture should be removed at this time, as should the anterior maxillary frenum when indicated.

■ *Methods for Alveolectomy*

There are two suggested methods for performing a labial alveolectomy to reduce a protruding anterior maxilla, which not only has caused the teeth to protrude but has also caused the upper lip to extend in an inverted V-shape, often exposing the entire crowns of the anterior maxillary teeth and the gingiva. Either of these methods may help to improve the appearance of the patient's mouth and, by so doing, may be the means of completely changing his attitude and restoring his self-confidence.

In the first suggested method for labial alveolectomy, the septum is removed so that the cortical plate may be collapsed, thus reducing the protrusion of the alveolar process without removing any of the cortical plate. The mucoperiosteum is incised, longitudinally, from the right to the left bicuspid area, on both the lingual and labial sides of the maxilla, slightly above the crest of the ridge. The remaining anterior maxillary teeth are then removed, care being exercised not to fracture the alveolar process. The mucoperiosteum is gently reflected 1 or 2 mm., so as not to tear or injure the tissue and to permit this bony edge to be trimmed and smoothed with files. At this point, thin rongeur forceps are used to completely remove the septum of bone. Then rongeur forceps or a chisel is used to remove a small amount of the alveolar process in both cuspid areas, in order to disengage the anterior cortical plate from the rest of the maxilla and, by means of pressure applied with the thumbs (placed on the labial portion of the anterior aspect of the maxilla) and fingers (on the lingual portion), the entire anterior portion of the cortical plate is collapsed by the subsequent pressure, so that it comes in contact with the lingual plate of bone. This process is then gently molded to the desired shape, after which the mucoperiosteum is held in place with sutures.

The second suggested method for labial alveolectomy is used in cases in which the first method does not give as much relief as is desired. This method con-

sists of removing the entire labial plate and as much of the alveolar septum as is deemed necessary. An incision is made, longitudinally, 1 to 2 mm. above the crest of the ridge and extending from the right to the left bicuspid areas, and the mucoperiosteum is reflected from the maxilla, the anterior teeth extracted, and the necessary amount of the cortical plate of bone, as well as the septum, is removed. The bony process is then smoothed with bone files. Any excess or hypertrophied mucosa should, of course, be removed and the mucoperiosteum held in position with sutures.

In performing a complete maxillary alveolectomy in an edentulous mouth, the incision is made through the mucoperiosteum distal to the right tuberosity and extending around the entire crest of the ridge to a point just distal to the left tuberosity. The labial and buccal mucoperiosteum is reflected, and the lingual side is then loosened from the crest of the ridge, care being taken to prevent tearing the soft tissue. The necessary alveolar process and the protuberances are removed with rongeur forceps or a sharp chisel, and these areas are smoothed with a file. The mucoperiosteum is then returned to its normal position and sutured.

When there is considerable resorption of the anterior segment of the maxillary ridge in an edentulous mouth, it may be necessary to trim the anterior nasal spine. The technic here is the same as that used for any routine alveolectomy except that exposure of the nasal spine may require reflection of the mucosa wall above the mucobuccal (mucolabial) fold.

A complete alveolectomy may also be performed at the time of the removal of the teeth. The procedure is essentially the same as the foregoing operation, except that the incision is made slightly above the crest of the ridge and extending from the right to the left tuberosity. The mucoperiosteum is then reflected and the necessary alveolar process removed. This greatly facilitates removal of the teeth and allows for better control over the amount of bone removed; it also prevents fracture of the process of the canine eminence, which so often happens when cuspid teeth are removed. After the desired amount of labial and buccal process over the roots is eliminated and the teeth removed, the remaining protrusions and sharp ridges must be trimmed with a chisel or rongeur forceps, and then smoothed with a file. The mucoperiosteum is then returned to its normal position and sutured. By performing the alveolectomy prior to the extractions, one reduces trauma and shock to a minimum. Also, the teeth, roots and their associated pathologic conditions are thereby removed in their entirety.

The procedure for a complete mandibular alveolectomy is essentially the same as the operations described above: Any sharp ridges or protruding areas, and also the tori lingualis, are removed, and the mylohyoid ridges, if they are unduly sharp, are smoothed. At this time, all low muscle attachments and flabby tissues are removed. Conservation of the alveolar bony structure is highly desirable, and excessive removal of bone should be avoided.

Partial alveolectomy, following the simple removal of individual isolated teeth, should be the rule rather than the exception. The technic is as follows: An incision is made on the crest of the ridge

distal to the tooth to be removed. This incision is extended forward to the distobuccal angle of the tooth, continued around the gingiva to the mesiobuccal angle, and then extended forward and upward to the crest of the ridge mesially to the tooth to be removed. A similar incision is made beginning at the point of the first incision, extending around the lingual surface of the tooth to be removed, and extending forward and upward mesially to the crest of the ridge to join the first incision. The mucoperiosteum is then reflected and the tooth removed. The necessary alveolar process is trimmed with rongeur forceps or a chisel. The excess tissue is then removed in order to approximate the tissue without a bulge, thus facilitating the healing and allowing for the immediate denture insertion in this area. The mucoperiosteum is then approximated and held in position by sutures on either side of the socket.

■ *Débridement Following Alveolectomy*

As in all oral surgical procedures, after an alveolectomy there should be a careful débridement of both the hard and soft tissues. All small spicules of bone and uneven or hypertrophied soft tissue should be gently removed and the entire operative field lavaged with a gentle stream of warm normal saline solution before the tissue is sutured.

■ *Controlling Asepsis*

The field of operation should be made as sterile as possible. Aseptic technic should be practiced by the oral surgeon at all times. Saliva in the area interferes with clot formation and may cause delayed healing of the periosteal wound. Every effort therefore should be made to keep the surgical field free of saliva. The field of operation should be sterilized with an antiseptic agent prior to the insertion of a needle or incision with a scalpel. Sterile rubber gloves should be worn by the oral surgeon for the patient's protection, as well as for his own.

■ *Postoperative Care Following Alveolectomy*

The postoperative care following alveolectomy operations is no different from that following any other oral surgical procedure. It is advisable, in most instances, to make a definite appointment for the patient to return in 24 hours for postoperative treatment. He should also be given a printed instruction sheet for home care. The surgeon's residence and office telephone numbers should be on this instruction sheet. A prescription to alleviate pain also should be given to the patient. This procedure will eliminate, to a great extent, any misunderstandings that might otherwise arise.

■ *Armamentarium*

In alveolectomy operations, I prefer the following armamentarium: Bard Parker blade no. 15, a fairly wide and flat periosteal elevator, curved tissue scissors, Alyce forceps, upper and lower rongeur forceps, a no. 3 chisel, a mallet, large round and pear-shaped burs, diamond files, two small hemostats, one small curved Kelly hemostat, large and small curets, cotton pliers, mirrors, needle holders, medium-sized, one-half round cutting needle, suture material, and 2 by 2 in. sterile gauze squares.

■ *Use of Burs in Alveolectomy*

Throughout this paper, reference has been made to the use of the chisel, rongeur forceps and files. However, bone drills or burs most assuredly have their place in the performance of this operation. Lesney[3] has written on this subject as follows:

> There is no serious contra-indication for the judicious use of burs in bone surgery. If the burs are frequently changed to assure clean sharp cutting edges, and if the operative field is frequently lavaged with a normal saline solution, frictional trauma to the bone can be avoided.
>
> Burs may be found advantageous in removing sclerotic mandibular bone, tori and nasal spine. It is not always possible to predetermine the amount of bone that the operator is going to remove with a chisel blow. Also, the patient may object to the mallet and chisel force under a local anesthesia, whereas he fully anticipated that the "dentist may use the drill."
>
> Burs, when used for bone surgery, can be considered as virtual "motor-driven files." Any large, round surgical bur . . . or even a round or pear-shaped vulcanite bur, can be used with success. Certainly, bur cuts leave a very smooth bony surface and the bur technique can probably be employed in an operative field that requires less exposure than that which may be needed for hand-filing.

■ *Use of Sutures and Suture Material*

It is not necessary to approximate the soft tissue to derive benefit from the suture, and one should make certain not to produce undue tension by pulling the suture too tightly. The oral surgeon should always plan to use as few sutures as possible, and the suture should be removed from the third to sixth day following the operation.

Some of the types of suture material recommended by various oral surgeons are 000 Luken tanned surgical gut, 00 plain surgical gut and horsehair, and silk of various sizes. Dingman[4] suggested, among other types, black cotton thread no. 40 or 50, and I have used this in all types of oral surgery for many years, the only exception being in operations on children, when the removal of sutures, postoperatively, is a factor to be considered.

■ *Type of Anesthetic Agents Used in Alveolectomies*

This type of surgery can be performed with the use of either a local or a general anesthetic agent. Profound anesthesia for alveolectomy of the maxilla can be obtained by injection of procaine hydrochloride into the posterior palatine canals. A 2 in., 25 gage needle is inserted into the region of the posterior palatine foramen on both sides, and up into the canal. Injection of this solution is made as the oral surgeon proceeds, and the needle is inserted approximately 1½ in. up each of the posterior palatine canals. The needle should now be in the sphenomaxillary fossa, near the superior maxillary nerve, just before it enters the infraorbital canal. Two and one-half cubic centimeters of the anesthetic agent should produce profound anesthesia of the entire side. Or, a tuberosity and infraorbital and posterior palatine injection may be given on both sides, together with an anterior palatine injection, with the same results.

Lesney suggests that, in performing

3. Lesney, Comdr. Theodore A., (DC) USN, Naval Dental School, National Naval Medical Center. Personal communication, 1951.

4. Dingman, R. O., and Hayward, J. R., Oral Surgery in General Practice. *J.A.D.A.* 35:607 (Nov. 1) 1947.

an anterior maxillary alveolectomy under a local anesthesia, one should choose an external infraorbital injection. His reasons are that an external infraorbital injection allows a more direct approach to the infraorbital canal than does an internal infraorbital injection. The external infraorbital block also is preferred to that of an infiltration method, because often a considerable amount of anesthetic solution may be required, which fills the tissue with the solution and causes considerable swelling. Also, there might be resultant postoperative pain and echymosis. This is eliminated by the external infraorbital injection.

For the mandibular alveolectomy, a mandibular and long buccal injection on each side will suffice. Most patients, however, prefer general anesthesia for all types of oral surgery, and it is fortunate that today there are several types of general anesthetic agents that can be used in routine oral surgical practice. Nitrous oxide and oxygen anesthesia has been used for many years with great success. Thiopental sodium anesthesia, which is used by many oral surgeons today, is indeed a boon to the operator as well as to the patient. An alveolectomy may be performed with any type of anesthesia, at the discretion of the oral surgeon. I prefer general anesthesia for all oral surgical procedures.

■ *Summary*

All oral surgeons, from time to time, have had occasion to perform an alveolectomy, either the complete or the partial type. This is a subject, however, about which there is great variance of opinion among general practitioners, prosthodontists and oral surgeons. Some criticize the oral surgeon for removing too much of the process and others, for not removing enough. There must be some misunderstanding, therefore, as to what is expected in the way of surgery of the mouth to obtain the best possible results for all concerned. The postoperative results of an alveolectomy should not be criticized without having first seen the patient clinically, preoperatively, and also the preoperative roentgenograms.

Factors that have contributed to the success of this operation, over the last 10 years, are the improvements in the technics of the oral surgeon, use of the chemotherapeutic agents, use of the antibiotic drugs to prevent infection, and the wider range in the choice of anesthetic agents. These advances have made it possible for the prosthodontist to obtain better results in the construction of his dentures. It is not possible to have well-fitting dentures unless there are firm, smooth ridges.

■ *Conclusions*

1. Alveolectomy is not a new oral surgical procedure. Literature on this subject dates back as far as 100 years.

2. The oral surgeon should be familiar with the type of bone with which he is dealing, and for this reason good roentgenologic studies should be made.

3. To promote better harmony among all concerned, and for better appraisal of the surgery contemplated, it is advisable for the operator to have a preoperative consultation with the patient.

4. The indications for this operation are many and varied and may include any type from the removal of a large torus palatinus to a complete maxillary and mandibular alveolectomy, or perhaps only

the smoothing of a sharp ridge in the area where a tooth has recently been removed.

5. The methods suggested in this paper are not new, but follow the same lines as any oral surgical procedure.

6. The operation consists merely of reflecting the mucoperiosteum in the area where the surgery is to be performed, the removal of any abnormalities with rongeur forceps, chisels or burs and smoothing with a file. The approximation of the labial and lingual periosteum follows, together with the necessary suturing.

7. The types of sutures should be those that are most adaptable in the hands of the operator.

8. It is just as important that asepsis be maintained in an alveolectomy as in any other oral surgical procedure; care in this respect may prevent many postoperative complications.

9. The type of anesthetic agent used should depend on the physical condition of the patient, the time element involved and the judgment of the operator.

10. The advances made by the oral surgeon in his specialty over the last decade, together with the advent of the so-called wonder drugs used to combat infection, and the wide choice in anesthetic agents are a few factors that have contributed to the successful outcome of alveolectomies.—*1835 Eye Street, N.W.*

Music as an aid in oral surgery

■ *John W. Seybold, M.D., D.D.S., Denver*

The use of music in medicine is as old as music itself. It is intimately associated with healing.[1] Although I have long used music in the induction of general anesthesia for oral surgery[2] it is only recently that I began using it in connection with deep conductive anesthesia. The pleased reaction of patients, as well as the enjoyment of the surgical team, is such that I feel that our method should be reported.

Schoen[3] found that the response to music is related to the psychologic levels at which they occur. The sensorial response to music is physiologic and possessed by all —the intellectually inferior, and superior alike. Altschuler,[4] a modern student of musical therapy, says, "Music can modify the mood, and stimulate the imagination and intellect."

1. Gatewood, E. L., Psychology of Music in Relation to Anesthesia. *Am. J. Surg.* 35:47 (April) 1921.

2. Seybold, John W., Practical Application of Nitrous Oxide and Oxygen in General Anesthesia. *Int. Jnl. of Orthodontia, Oral Surgery & Radiography (Anesthesia supp.)* 14: 710 (Aug.) 1928.

3. Schoen, M., *Psychology of Music*. New York: Ronald Press, 1940.

4. Altschuler, I. M., Part of Music in Resocialization of Mental Patients. *Occup. Therapy* 20:75 (April) 1941.

If reflex irritability is raised to high levels by fear, pain or temperature, it becomes more difficult to control the patient. The heightened reflex irritability produces an increased oxygen demand, particularly in the tissues of the central nervous system which can least withstand hypoxia or anoxia and are most subject to irreversible damage. Hypoxia stimulus, acting by way of the carotid body, can maintain circulation and respiration so well that the untrained anesthetist may be given a false sense of security. The advent of respiratory and circulatory failure is sudden, and frequently irreversible.[5]

The choice of anesthesia for patients having moderate or severe cardiac disease has always been a problem, and anoxia of the cardiac muscle is to be feared and prevented by avoidance of a fall in diastolic blood pressure, since it is on the diastolic pressure that the coronary arteries depend for their blood supply.[6]

Music depresses reflex irritability and consequently it is a decided safety factor for it aids in the elimination of the exciting stage of general anesthesia and its sequela. It occupies the mind of a patient under deep conductive anesthesia and promotes mental comfort.

The musical equipment consists of a small automatic electric phonograph that will play eight or 10 records without requiring changing or attention. The music should be soft, waltz time harmonies, pleasing and soothing to the patient. Our machine is located behind the patient and to his left so that he does not see it.

The patient is told by the surgeon that he will smell oranges, then feel a pleasant glow over the body, and following this he will hear music.[7] This is literally true, for the nurse seemingly accidentally touches the tip of the nose with her finger, which has been touched with oil of orange as she gently lowers the nose mask over the nose. The pleasant glow results from the action of nitrous oxide and oxygen which has been turned on as the nose mask is applied. The phonograph is turned on so that the tubes are warmed up before the patient is seated in the chair, and while the turntable with the records is running, it is soundless and will not play until the release button is touched, which automatically places the needle on the record. At the proper moment the surgeon says, "Now you will hear music," and the nurse touches the button and the soft music is heard. No further attention need be given to the phonograph for it will play continuously until stopped at the completion of surgery.

In the use of music with deep conductive anesthesia, no mention of music is made. At the beginning of the operation the nurse starts the phonograph and the patient's nervous tension rapidly subsides. The operator can feel the patient relax if he has induced good anesthesia.

It is a great pleasure for an oral surgeon to hear patients express their gratefulness for being carried through what they thought would be a painful experience.—*1526 South Lincoln.*

5. Pallin, I. M., and Chiron, A. E.: Indications for Music in Anesthesia. *Anesth. & Analg.* **29**:195 (July-August) 1950.

6. Belinkoff, S.: Choice of Anesthesia in Cardiac Disease. *Anesthesiology* **7**:268 (May) 1946.

7. Seybold, J. W.: Super-oxygenation in Nitrous Oxide and Oxygen Anesthesia. *J. Oral Surg.* **7**:55 (Jan.) 1949.

Neuralgia involving the infraorbital nerve: *report of case*

■ *Ralph W. Taylor, D.D.S., and Homer S. Samuels, D.D.S., San Diego, Calif.*

The patient, a 50 year old white man, was hospitalized in 1946, with the complaint of pain in the left maxillary arch with wide radiation to the supraorbital, temporal and occipital regions of 10 years' duration. The attacks usually began with a knife-like stab, increasing in intensity and reaching a climax of sharp excruciating pain. The attacks varied in time and intensity from 10 minutes to six hours and were followed by headaches. He had been seen at several large clinics in this country, and a bilateral ligation of the middle meningeal artery had been done at a private hospital, with complete relief of headaches. The facial, temporal and occipital pain persisted. All left maxillary posterior teeth were extracted. Several infraorbital alcohol injections were performed, with varying degrees of success.

Six months prior to admission, two infraorbital blocks were accomplished; the first was unsuccessful, but the second gave relief for several months. An intraoral infraorbital injection block gave temporary relief, and the patient was discharged from the hospital.

Since the patient stated that he obtained relief from the pain when his sinuses were drained and had had only temporary relief with infraorbital alcohol injections or histamine desensitization, a submucous resection was performed in 1947 under local anesthesia. There was no relief from pain as a result of this operation. The patient then consulted a neurosurgeon, who gave him an alcoholic injection with no relief of pain.

In January 1948, the patient consulted another specialist. Treatment during this period consisted of irrigation of paranasal sinuses, excision of nasal turbinates and treatment for migraine headaches, which had recurred in May 1949. The patient was admitted to a hospital, where a pneumoencephalogram was done, with no resulting relief from attacks.

In July 1949, an alcohol block of the infraorbital nerve gave the patient relief for about three months.

The patient had consistently maintained that the pain was originating from a localized point deep in the infraorbital region. Attending physicians had thought that the origin was a result of generalized nervous system pathologic changes. The patient requested a resection of the gasserian ganglion but was advised not to have this operation.

Having had no permanent relief of pain and having exhausted his funds, the patient decided to attempt to bear the pain and work as best he could. Since he was able to work only two days a week, his employer requested that he consult the company's physician and obtain a certificate of medical disability. The physician stated that he was incurable, inoper-

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Captain, DC, USN, U. S. Naval Hospital, San Diego, Calif.

Lieutenant (jg), DC, U. S. Naval Hospital, San Diego, Calif.

able and eligible for permanent disability payments.

The pain become so intense and occurred so frequently that the patient applied for admission to this hospital, and on March 6, 1950, he was hospitalized. At this time the neuralgia was partially relieved by intravenous administration of 0.1 per cent procaine in 5 per cent glucose, and the headaches were relieved temporarily by the administration of codeine and meperidine hydrochloride (Demerol).

On March 14, neurologic examination disclosed that headaches were aggravated by jugular compression and relieved by carotid pressure and that during a severe headache there was facial and neck blush or hyperemia. In view of this, on March 21, 1 cc. of vasopressin injection (Pitressin), mixed with blood, was given intravenously over a three to five minute period to counteract vasodilation. About three minutes later the patient became pale, weak and mildly dyspneic. He soon recovered, with residual loss of facial flush and greatly diminished headaches.

On April 4, a second division trigeminal procaine block was attempted by external approach but was unsuccessful. On April 5, the same procedure was repeated but was unsuccessful. On April 11, the temporal neuralgia was relieved for several hours by a temporal local block. The headaches were relieved by administration of vasopressin injection or epinephrine (1 cc.). Oral administration of vasopressin hydrobromide was of no value.

On April 12, in neuropsychiatric consultation, it was suggested that a conditioned reflex mechanism had been set up between the trigeminal neuralgia and intense headaches whereby each one stimulated the other into activity. It was recommended that the patient be given tetraethylammonium (Etamon) chloride, 10 mg. per kilogram of body weight with increases of 100 mg. each day until 17 to 18 mg. per kilogram of body weight had been reached. Blocking out the autonomic nervous system might allay the attending anxiety, and the vicious cycle might be broken. Multivitamin therapy was also recommended. The above treatment was begun on April 12. Some temporary relief was obtained by this treatment.

On May 11, a cerebral arteriogram (left side) was made and ligation of the external carotid artery was done. On May 18, considerable regression of the headache pattern was noted. Local administration of procaine relieved the orbital neuralgia for several hours. On May 25, an alcohol block of the left supraorbital nerve was done. This produced relief of supraorbital pain. On May 31, the patient had complete relief of supraorbital pain, but he then complained of a deep-seated pain along the sphenopalatine ganglion and maxillary nerve branch.

On May 31, a dental consultation was requested. The patient was examined by the dental staff of this hospital. His chief complaint was that he suffered frequent, prolonged, excruciating paroxysms of pain, which appeared to be localized in the left infraorbital canal. During an acute attack the second division of the fifth cranial nerve was injected with 2 per cent procaine. The patient was asymptomatic for the duration of the anesthesia.

On June 12, an attempt was made to inject 1 cc. of 95 per cent ethyl alcohol into the second division of the trigeminal nerve in the region of the pterygopalatine fossa. The patient's condition was improved for approximately three days. The attacks were mild during this period. However, the pain returned in full intensity in two weeks. No attempt was made to inject the infraorbital nerve, since, according to the patient's history, this had been attempted several times without satisfactory results.

On June 21, under local anesthesia the infraorbital foramen was surgically exposed from an oral approach. A section of the infraorbital nerve was avulsed from the canal. A needle was then inserted approximately 1.5 cm. into the canal, and 0.5 cc. of 95 per cent ethyl alcohol was injected. On June 22, the patient stated that he had experienced no pain since the operation. He complained only of slightly disturbed vision in the left eye.

On June 25, the patient was asymptomatic except for slight double vision in the left eye. This condition was improving daily. On June 26, an eye consultation was requested; the report suggested that some of the alcohol infil-

trated the inferior oblique muscle, causing the diplopia, but that the condition should clear up in the near future. On June 27, the patient was asymptomatic and was discharged from the hospital.

Follow-up examination on July 6 revealed that the patient had remained asymptomatic; he stated that he was without pain for the first time in several years. The visual disturbance was negligible. The patient was last seen in December, 1950, when he stated that he had had no further difficulty.

Chemical osteomyelitis of the mandible: *report of case*

■ *Albert David Alexander, D.D.S., Washington, D. C.*

Dental literature is replete with cases of chemical damage to the jaws. Such agents as arsenic, phosphorus, phenol and other protoplasmic poisons are discussed. The case reported here is considered unique by the manner in which the chemical was introduced as well as the agent which caused the damage.

A number of dentists have adopted the routine use of sulfanilamide locally following dental extraction. The case presented here illustrates the sequelae of the introduction of paraformaldehyde crystals which were thought to be sulfanilamide crystals. It is the desire of the dentist involved in this situation that his case be reported in an effort to publicize the incident and thus prevent similar occurrences.

On October 8, 1948, an ambulatory patient was brought into the office by her dentist who requested consultation. This practitioner is a gentleman of considerable professional reputation, and his concern prompted an immediate examination.

HISTORY OF PRESENT ILLNESS—In July, 1948, the mandibular left third molar was extracted under local anesthesia. The postoperative course was stormy and marked by periodic swellings of the face accompanied by pain and fever. Several sequestra had been removed from the wound after about six weeks. The patient had been treated palliatively and had been given penicillin by her family physician (three intramuscular injections of penicillin in oil and beeswax, 300,000 units each). There followed a period of quiescence for about two months. However, the condition seemed to be getting much worse during the last several days and appeared to be at its worst in July, 1948.

At this point, the dentist asked me to step into another room and gave me the following information: "After extracting the tooth, I placed paraformaldehyde crystals into the wound, thinking I was using sulfanilamide, which I keep in a similar-looking bottle. The error was not discovered until the next day when the patient returned. I found there was no clot, but otherwise the wound did not appear unusual. There was no trismus and no swelling. The patient seemed to be getting along all right. The socket was irrigated vigorously and I just hoped for the best. The next day the patient called me and told me she was in pain,

that her jaw was swollen and that she felt ill. I treated the wound locally and repeatedly, daily at first, then every other day. Meanwhile, her physician gave her a course of penicillin treatment. A number of obtundents and germicidal drugs were used, but despite everything the wound remained painful and would not heal. During the past week I became alarmed and now feel that the situation is serious. I have not told the patient of the error."

EXAMINATION—Examination showed an alert, intelligent, cooperative white female, aged 27, who was in pain, but not acutely ill, with a massive cellulitis of the left face and jaw. Oral temperature was 102.2, pulse rate was 100. There was an area of acute cellulitis of the left cheek measuring about 8 cm. in diameter. There was a demonstrable lymphadenopathy of the left submaxillary nodes and the superior deep cervical nodes. The postextraction wound was not healed and presented a hemorrhagic and necrotic base. There was a moderate amount of swelling in the immediate region with ischemia of the overlying mucosa.

Roentgenographic studies of the mandible revealed an area of bone destruction 2.5 by 2.5 cm. in the second and third molar regions. A radiopaque mass was noted, measuring 1.5 by 0.7 cm. in its greatest width, within the greater radiolucent area of destruction (Fig. 1, left). The findings were compatible with osteomyelitis with a large sequestrum.

TREATMENT—Since the second molar was obviously involved in the process and was loose, no treatment was designed for its retention. The patient was placed on general supportive treatment and sedation. On October 10, the second molar and a large sequestrum were removed. The defect was found to be partially filled with clots in varying stages of organization, some young granulation tissue and considerable necrotic tissue. Débridement and

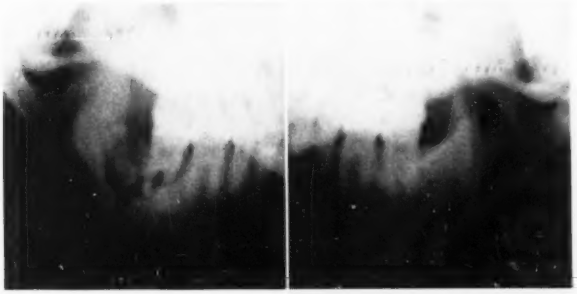


Fig. 1.—Left: Preoperative views taken on October 10. Note large sequestrum within the area of destruction

Right: Specimens sent for pathologic study included the second molar and the large sequestrum

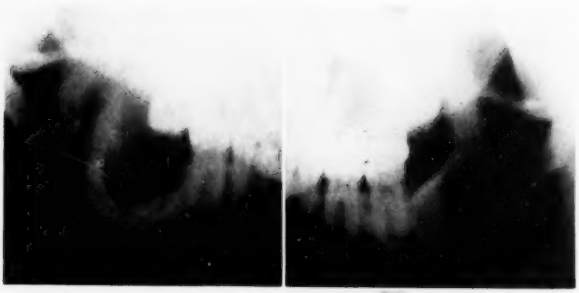
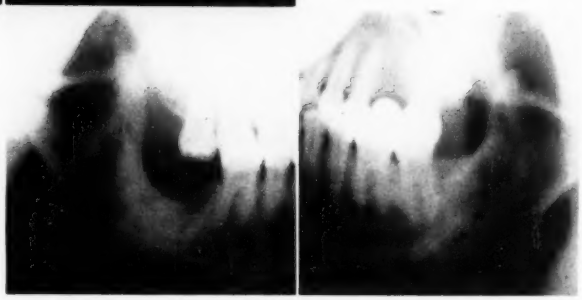


Fig. 2.—Left: Postoperative views taken on October 11 showed a clean defect



Right: Views taken March 10, 1949 showed the region to be filling in with normal appearing bone

saucerization of the defect were done. The necrotic gingiva was excised and the wound packed with petrolatum gauze. The specimens sent to the pathologist included the tooth removed as well as the diseased bone (Fig. 1, right).

The patient experienced relief from pain rapidly. Postoperative roentgenograms taken on October 11 showed a clean defect (Fig. 2, left). Healing took place uneventfully and all the packing was removed on November 23.

Progress roentgenograms taken on March 10, 1949, showed the region to be filling in with normal appearing bone (Fig. 2, right). The oral mucosa at this time was completely healed and the patient had been symptom-free for nearly four months.

Several sections were prepared for microscopic study, one of which was a molar tooth. There were numerous fragments of partially necrotic bone, only one of which showed any interstitial fibrous connective tissue. In this latter fragment there was an increased fibrosis and a diffuse sprinkling of mononuclear cells, together with occasional granular leukocytes.

The histologic findings suggested a diagnosis of osteomyelitis, undoubtedly the result of the application of the paraformaldehyde crystals. The diagnosis was osteomyelitis of the mandible.

SUMMARY AND CONCLUSION—Paraformaldehyde is a white, crystalline powder, similar in appearance to sulfanilamide crystalline powder. It is capable of producing chemical osteomyelitis in the mandible.

This case is reported for the object lesson value of careful scrutiny of any drug that is to be placed in a postextraction wound.—*1718 Eye Street, N.W.*

Monostotic fibrous dysplasia occurring in the mandible: *report of case*

■ *L. E. Jordan, D.D.S., and John F. Drapiewski, M.D., Wilkes-Barre, Pa.*

The monostotic and polyostotic varieties of fibrous dysplasia of bone have but one important feature in common; that is, a similarity in the histologic characteristics of the bone lesions. Terminological considerations are further confused by a clinical and roentgenographic similarity between monostotic fibrous dysplasia and so-called ossifying fibroma. Lichtenstein[1] and Mallory[2] believe that lesions of the mandible and maxilla diagnosed as ossifying fibroma are actually variants of monostotic fibrous dysplasia. Schlumberger[3] has enlarged upon this subject in an intensive study of a large series of cases.

Lichtenstein and Jaffe[4] have suggested that monostotic fibrous dysplasia occurs more frequently than is usually appreciated. The case reported here is offered in support of their contention.

An unmarried white female, aged 25, was referred because of a painless, hard swelling in the left mandible. She noticed the swelling approximately one year previously. It had gradually increased in size so that there was obvious deformity in the region of the mandibular molar teeth on the left. Several years before, the lower left first and second molars had been extracted because of caries. Recovery was uncomplicated and uneventful.

The patient had no other complaints. Catamenia started when the patient was 13 years old. Since then, menstrual flow had been essentially normal in duration, frequency and amount. Physical development before puberty was normal. She complained of nothing which would point to endocrine dysfunction.

Physical examination revealed a well developed, well nourished, apparently healthy young woman. There was a satisfactorily fitting upper denture. The lower anterior teeth were in good condition. The remainder of the lower jaw was edentulous except for the left third molar. Extending from the bicuspid region to the third molar tooth in the left side of the mandible was a smooth, hard, nontender mass which apparently had displaced the cortical bone laterally, inferiorly and superiorly. The mass measured approximately 4.5 by 3 by 3 cm. The overlying gingiva was smooth and slightly thickened. Externally there was a corresponding facial deformity which appeared as a nontender enlargement covered by easily movable, apparently normal skin. General physical examination revealed no other abnormality.

Roentgen examination of the jaw revealed a sharply outlined, radiolucent, apparently noncystic mass occupying the body of the left mandible (illustration, *A*). It extended from the distal root of the third molar anteriorly to the mental foramen. Many small, opaque shadows were scattered throughout the mass. It had displaced the alveolus slightly. The remainder of the mandible and the maxilla were roentgenographically negative.

Preoperative routine blood counts, bleeding and coagulation time and urinalysis yielded results within normal limits.

Under block anesthesia an incision was made over the alveolar crest of the left mandible extending from the third molar region to the first bicuspid region. The flap was retracted generously and a thin plate of bone was widely exposed. This was removed with rongeur forceps

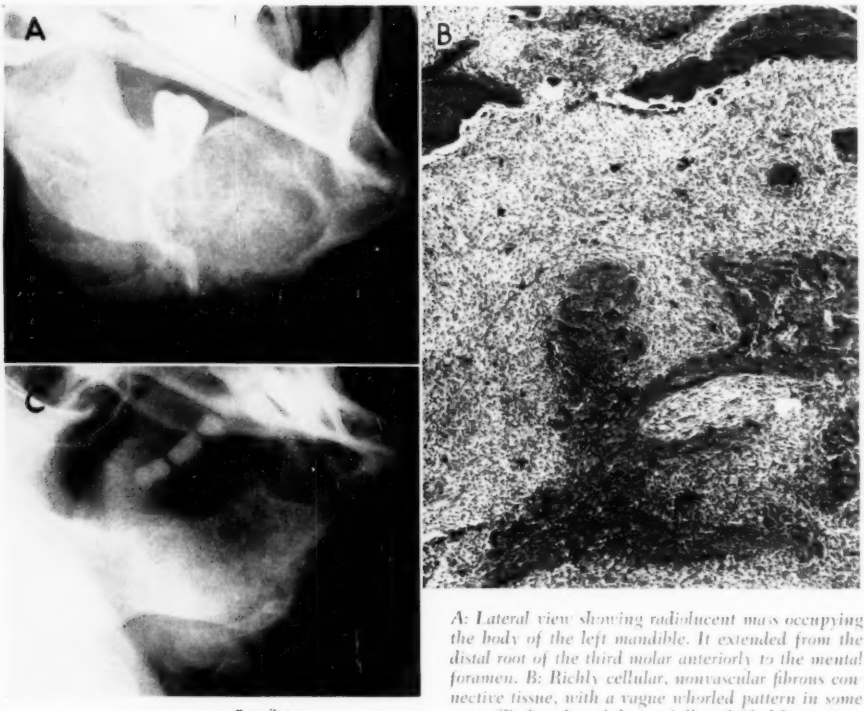
From the departments of oral surgery and pathology, Mercy Hospital, Wilkes-Barre, Pa.

1. Lichtenstein, L., Polyostotic Fibrous Dysplasia. *Arch. Surg.* 36:874 (May) 1938.

2. Mallory, T. B., Pathology: Diseases of Bone. *New England J. Med.* 227:955 (Dec.) 1942.

3. Schlumberger, Hans G., Fibrous Dysplasia of Single Bones. *Mil. Surgeon* 99:504 (Nov.) 1946.

4. Lichtenstein, L., and Jaffe, H. L., Fibrous Dysplasia of Bone. *Arch. Path.* 33:777 (June) 1942.



A: Lateral view showing radiolucent mass occupying the body of the left mandible. It extended from the distal root of the third molar anteriorly to the mental foramen. B: Richly cellular, nonvascular fibrous connective tissue, with a vague whorled pattern in some areas. Trabeculae of dense, fully calcified bone, spicules of partly calcified bone and quantities of osteoid tissue are distributed evenly throughout. Osteoclasts were infrequent. No cartilage was identified. C: Seven months postoperatively there was excellent healing with regeneration of bone at the operative site

revealing a cavity filled with a grey-white, somewhat friable, rubbery mass. Using large curets, the mass was enucleated in two pieces. The internal surfaces of the resulting cavity consisted of bone. The wall of the cavity on the buccal side was thin, that on the lingual side was thick, firm and dense. The mandibular vessels and the mandibular nerve were not visible. Silk sutures were used for closure.

The gross specimen consisted of two grey-brown, firm, solid, noncystic, nonencapsulated, somewhat rubbery pieces of tissue, one measuring 3.5 by 2 by 1.5 cm. and the other 3 by 1.2 by 0.8 cm. The cut surfaces were grey-yellow with spicules of bone or very small deposits of calcareous material scattered throughout.

Microscopic examination revealed richly cellular, nonvascular fibrous connective tissue which in some areas had a vague whorled pattern (illustration, *B*). Distributed evenly throughout were trabeculae of dense, fully calcified bone, spicules of partly calcified bone and quantities of osteoid tissue. Osteoclasts were infrequent. No cartilage was identified. The diagnosis was fibrous dysplasia of bone.

The postoperative course was uneventful. Within 11 days almost all of the bony defect had filled in with healthy granulation tissue. A

roentgenogram taken seven months later showed excellent healing with regeneration of bone at the operative site (illustration, C). However, the externally visible deformity of the lower border of the mandible was cosmetically objectionable. Eight months later, under thiopental anesthesia, and using an external approach the bony prominence was removed with rongeur forceps and bone files. Gelfoam soaked with thrombin was placed in the defect and the skin was tightly closed with silk sutures. The postoperative course was without incident. After more than two years, the patient shows no evidence of recurrence of the lesion and the cosmetic result is optimal. In the interval between the original operation and the corrective procedure, roentgenograms of the entire skeleton and blood calcium and phosphatase determinations disclosed no abnormalities.

COMMENT—The foregoing case satisfies the diagnostic criteria for a disease which, for the time being at least, is satisfactorily designated as monostotic fibrous dysplasia. Schlumberger[3] has proposed a cause and effect relationship between the lesion and local injury to bone. There was no evidence of trauma in this case beyond the uncomplicated extraction of teeth at the site of the lesion. There is no satisfactory evidence to indicate that monostotic fibrous dysplasia has a greater incidence following exodontia. Whether there was an etiologic relationship in this case is not amenable to proof.

Bronchogenic carcinoma with probable metastasis to the gingiva: *report of case*

■ *Bruno W. Kwapis,* D.D.S., M.S., St. Louis, and Joseph O. Kuebel, D.D.S., New Orleans*

The following is a report of a case of metastatic oral carcinoma from a primary site in the lung. The relative infrequency of such an occurrence and the palliative treatment of the lesion makes this an interesting case.

A white man, aged 54, came to the Jefferson Davis Hospital, Houston, Texas, on March 8, 1950. He was in an emaciated condition and complained of pain and swelling of the left mandible (Fig. 1). Regional cervical lymphadenopathy without elevation of temperature was demonstrable. The pain, of about one month's duration, originally relieved by aspirin, had increased in severity until the drug was no longer effective.

Examination revealed a partially edentulous patient whose remaining teeth exhibited caries and severe attrition. In the left mandibular bicuspid regioa there was a swelling of the gingival mucosa, measuring about 1 cm., moderately firm in consistency, freely movable, covered by normal appearing mucosa and not tender to palpation.

Approximately two years previously the patient sought medical attention for a "hacking" cough. The examining physician attributed it to the patient's smoking of cigarets. After cau-

*St. Louis University, School of Dentistry, St. Louis.

tioning him to refrain from further smoking, he dismissed the patient with a prescription for alleviation of the cough. No roentgenograms were taken. The cough persisted after cessation of smoking and, since the condition did not improve, the patient returned to the habit and sought no further medical care.

Our original impression, influenced by the local factors and immediate history, was that the lesion resembled an alveolodental abscess. The region was incised for drainage. Instead of the anticipated pus a minimal amount of hemorrhage ensued. The unusual appearance of the submucosal tissue led us to resect a portion for microscopic examination.

The microscopic sections of mucosa and submucosa demonstrated the following: The

Fig. 1.—Appearance of patient, showing swelling of the left mandible

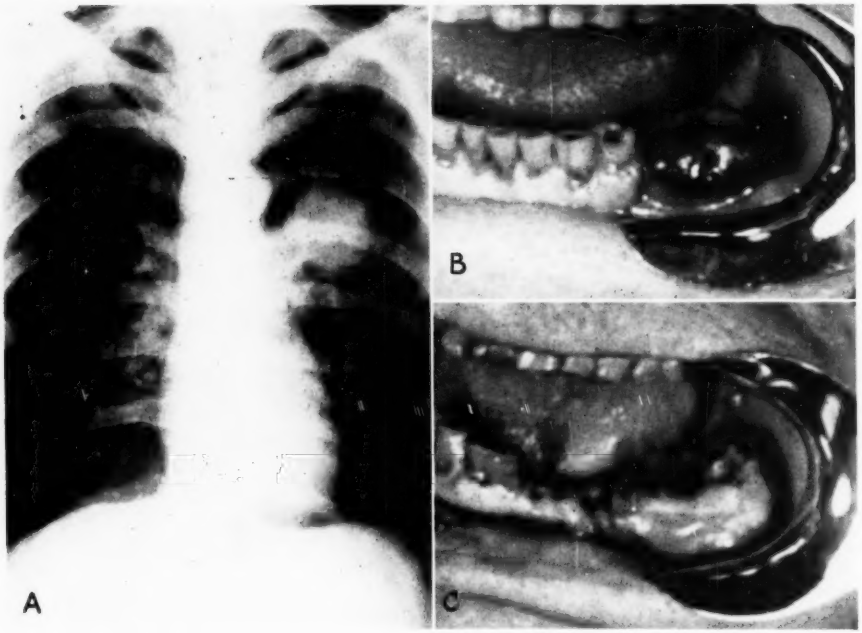


Fig. 2.—A: View of chest showing primary site of carcinoma in the lung. B: Oral lesion one week after biopsy. C: The enlarged oral lesion one month after biopsy and roentgen therapy

uniform squamous epithelium showed no malignant change. However, in the tissue immediately beneath the lining epithelium there was a tumor composed of sheets of large pleomorphic cells containing large, round hyperchromatic nuclei. A considerable amount of vacuolization was present in the cytoplasm of the cells. Mitotic figures were frequent. The tumor grew invasively as evidenced by the multidirectional projections in the submucosa. The tissue immediately surrounding the tumor exhibited extensive necrosis and degenerating inflammatory cells. The diagnosis was undifferentiated metastatic carcinoma in the gingiva.

On this basis the patient was admitted to the hospital for further diagnostic studies. A physical examination of the patient was essentially negative.

The roentgenographic examination of the mandible was negative. The routine chest plate revealed scarring in both apexes, more noticeable on the left (Fig. 2, *A*). Also present was a circumscribed area of infiltration in the hilar region of the upper lobe of the left lung compatible with carcinoma of the lung in that region. The impression was carcinoma of the lung with pulmonary tuberculosis.

Figure 2, *B* shows the oral lesion a week after biopsy.

Since bronchogenic carcinoma with metastasis is considered an incurable disease, only palliative therapy was indicated. A bronchoscopy to obtain some of the neoplastic tissue from the lung proved unsuccessful. As the oral tumor progressively increased in size the pain increased in severity, requiring heavy doses of opiates. Several of the teeth in the region were removed and roentgen therapy was instituted.

One month after admission, in an effort to alleviate pain, the mandibular nerve was severed at its point of entrance into the mandibular foramen. The patient received considerable relief from the mandibular pain. Although a total of 1350 r in nine separate doses of radiation was administered, the oral tumor increased in size (Fig. 2, *C*). Finally, on May 16, 1950, two months after admission to the hospital, the patient died. Unfortunately permission for an autopsy could not be obtained.

SUMMARY—A case of bronchogenic carcinoma with probable metastasis into the oral cavity is presented. Two years previous to the onset of the oral lesion, a history of pulmonary disease was noted. The metastatic tumor proliferated rapidly with corresponding increase in pain. Palliative radiation therapy was of no benefit in reducing the growth or pain. A neurectomy of the mandibular nerve resulted in adequate relief from the pain in the left mandible until the patient died.

■ SERVICE

You can best serve the cause of the common man by developing what is exceptional in you rather than by worshiping what is average. . . . The individual by his qualities rather than his lack of them guarantees the integrity of the group.—*John Mason Brown.*

Frederick A. Henny
New Editor

Reed O. Dingman
Retiring Editor

Frederick A. Henny, new editor

Frederick A. Henny of Detroit has been appointed by the Board of Trustees of the American Dental Association to succeed Reed O. Dingman as editor of the Journal of Oral Surgery. His appointment became effective April 1.

Dr. Henny was born in Saginaw, Michigan, on October 17, 1912. Following two years at Junior College, Flint, Michigan, he entered the University of Michigan School of Dentistry and was graduated from that institution in 1935. He received his intern and residency training in oral surgery at the Henry Ford Hospital, Detroit, from 1935 until 1938 following which he was appointed associate surgeon in the hospital's Division of Oral Surgery, a position which he still holds. Dr. Henny is a diplomate of the American Board of Oral Surgery and a member of the American Dental Association, American Society of Oral Surgeons, Great Lakes Society of Oral Surgeons, and the Chalmers J. Lyons Academy of Oral Surgery. His wide acquaintance in the field of oral surgery and his extensive writings on the subject, and his three years' experience as associate editor of the Journal of Oral Surgery, assure readers that he will maintain the high standards set for the publication by his predecessor, Dr. Dingman.

A new era

With the current issue, a new editor assumes responsibility for carrying on the traditions and destinies of the JOURNAL OF ORAL SURGERY. We assume these responsibilities, fully cognizant and appreciative of the high standard of journalism attained by our predecessor, Reed O. Dingman. His resignation, caused by the pressure of other duties, creates a void that will not be filled easily. All oral surgeons, and others interested in oral surgery, owe Dr. Dingman a debt of gratitude for his untiring and continous efforts to improve the JOURNAL OF ORAL SURGERY; to make it a dignified scientific periodical of the highest order. Under his capable guiding hand, the JOURNAL has come of age, commanding the widest respect for its content and authority. Fortunately, Dr. Dingman remains as an active associate editor. His considerate aid and counsel already has eased the task of the new editor on many occasions. For this we are deeply grateful.

The future of the JOURNAL OF ORAL SURGERY is indeed one that stirs the imagination. It is hoped that the JOURNAL can be published more frequently, and that through added advertising revenue and increased circulation much of the steadily climbing cost of operation can be offset. These changes must, of course, be accomplished by gradual evolution to avoid sacrificing the high standards that have been adopted and maintained in the past.

Oral surgery is at a point in its development where the answer to many puzzling problems should be found within the foreseeable future. The use of these pages to record the formal reports of clinical investigation of these problems will do much to aid this evolutionary change materially and at the same time permit a proper balance between articles based on factual case reports and those based on clinical research. Certainly the emphasis of each issue shall be on progress.

Your new editor assumes his position with humility and with full realization of his great responsibilities in providing an outstanding voice for oral surgery. He begs your understanding and cooperation.—*Frederick A. Henny.*

Dilemmas in defining specialty fields

The establishment of an agency, within or without the American Medical Association, has been recently suggested[1] to clarify the responsibilities and duties of the various specialties and to act as an adjustment or appeal board to settle interspecialty conflicts. This suggestion has a bearing on current problems of oral surgery in its relations with other specialties.

Oral surgery, like any institution, exists because of public need or interest. Rigidity or selfishness cannot prevent the ultimate disintegration of any institution which has outlived its usefulness or which requires modification. On the other hand, an institution which is aware of its responsibilities and opportunities and is progressive in its growth and attitudes cannot be destroyed or have its functions usurped by others.

The nation's health has been confided to the care of medicine and dentistry. Increase in knowledge has produced specialty practice by evolutionary means. The treatment of diseases, injuries and malformations of the mouth, teeth, jaws, and associated parts, has been allocated to dentistry and its specialties. The other areas of the body, naturally, belong to the general practice of medicine and its specialties. There are no fences which separate sections of the human body to prevent conflicts at borders between special fields. Disagreements among allied specialists are seldom serious if required patient services are performed by those who are fully competent. The public interest should be the determining factor in decisions involving special services which overlap. The people who are to be served are not concerned as much with intraprofessional squabbles as they are with the quality of the services rendered.

Large centers possess specialists in abundance but each of these practitioners does not, necessarily, cover every phase or detail of his specialty. The smaller communities usually have representatives of the major specialties as well as most of the minor ones and in these areas, likewise, all of the men who limit their fields of service may not be completely trained to perform all of the duties which their chosen specialties usually encompass. Perhaps, occasionally, someone else is better qualified to perform a certain task than the one who, normally, would undertake it. Also in some hospital groups, whether they are in large cities or not, certain individuals sometimes develop special skills which would normally be outside their usual field of endeavor. In these instances the patients' interests would seem to call for the assigned utilization of these skills, whether rendered by general surgeons, oral surgeons, otolaryngologists or any others.

1. Owens, Neal. Clinical dilemmas in the specialty practice of medicine. Plast. & Reconstruct. Surg. 8:349 (Nov.) 1951.

Otolaryngologists are representatives of one medical specialty, the need of which has been greatly reduced recently largely because of the development of the antibiotics. Many of them have expanded their services and many encroach on other fields. If an otolaryngologist has, by basic study and training, acquired the experience which enables him to render a type of service which is superior to that offered by the local oral or plastic surgeon, it would seem that, if he stays reasonably close to his own territory, he should be encouraged in his efforts. It would be a waste of competent medical manpower to do otherwise, especially if, in his own locality, no completely trained oral or plastic surgeon is present. There seems to be no valid reason for complaint if an otolaryngologist cares for nasal plastics or if an oral surgeon operates for the correction of cleft palates and cleft lips—provided, again, that his training and experience are adequate. Incompetency, or any claim of proficiency which is not borne out by performance, reacts to the detriment of the individual and reflects on the integrity of the specialty which he represents.

If oral surgeons are to retain control of their field they must be worthy of it. One who has confined his training and practice to the minor aspects of oral surgery should quarrel with no one if a portion of what he considers to be his field but does not practice is taken over by others. On the other hand, oral surgeons who are fully trained may well be critical of those who encroach on them and should, therefore, accept responsibilities in their hospitals and residency training programs so that those preparing for a specialty of medicine may see and respect oral surgery for what it is.

The preservation of the institution of oral surgery, if it is old enough to be considered an institution, depends on the improved training and education of dentists in the field of oral surgery. Complete competence is the answer. Basic training combined with adequate clinical experience is essential for proficiency. If oral surgery is to progress, these two requirements must be met. If they are not, oral surgeons deserve to have the field taken over by others.

As to the desirability of an outside agency, such as has been suggested, to settle differences among the practitioners of the various specialties, the aim is laudable but in the absence of sharply delineated borders between specialties the results might be disappointing. Individual, personal qualifications are difficult to evaluate from a distance. Conflicts can be settled at the community level. Attempts to interpret and effectuate rigid or inflexible rules governing what is to be included in or excluded from each specialty could be extremely confusing and, perhaps, would not always contribute to the public interest. If such a coordinating agency ever should come into existence, however, let us wish it well and hope that it will award oral surgery the consideration it deserves so that the competence of the fully trained oral surgeon may be recognized.—*J. Orton Goodsell.*

John W. Kemper

JOHN W. KEMPER, head of the department of oral surgery at the University of Michigan School of Dentistry, died on May 8, 1952 at the age of 60.

Dr. Kemper was born in Richmond, Indiana, September 14, 1891. After graduating from high school in that city in 1910 he entered Earlham College. He entered the University of Michigan School of Dentistry in 1914 from which institution he was graduated in 1917. From 1917 to 1923 he practiced oral surgery in Detroit. In 1923 he enrolled in the University of Michigan School of Medicine and received his M.D. degree in 1927. He served his internship in the University Hospital and then became an assistant resident physician in the department of obstetrics and gynecology.

In 1929 Dr. Kemper returned to dentistry when he accepted an appointment as assistant professor of oral surgery in the School of Dentistry at the University of Michigan. In 1935 he became professor of oral surgery and head of the department of oral surgery and consulting dental surgeon to the University Hospital.

Dr. Kemper was a member of many professional, honorary and learned societies, among them the American Dental Association, the American Medical Association, the American College of Surgeons, the American Board of Plastic Surgeons, Omicron Kappa Upsilon, Phi Rho Sigma and the American College of Dentists. In 1939 he was a member of the National Committee on Hospital Dental Services of the American College of Dentists and served as president of the American College of Maxillo-Facial Surgery in 1947-48. During World War I, he was a first lieutenant in the Army Dental Reserve Corps.

Dr. Kemper was married in 1918 to Marjorie Meagan of Richmond, Indiana, who survives him.

■ Removal of Bony Growths

Q.—What are the indications for the removal of tori of the palate and mandible?

A.—Interference with a proposed prosthetic replacement, surface irritation and neuroses or phobias related to the exostoses are indications for the removal of such bony growths.

■ Aids to Vision in Treating Inaccessible Areas

Q.—Fractured apexes of upper third molars offer troublesome difficulties. What routines will help in these inaccessible areas?

A.—Since vision of the field is the chief handicap here, all measures which will promote access should be utilized. These include: near-horizontal position of the patient, head turned to the opposite side, jaws nearly closed to relax the cheek for maximum retraction, good exposure by reflection of an adequate buccal mucoperiosteal flap, as well as the usual essential aids such as good light, suction, hemostasis and suitable armamentarium.

■ Trauma to the Temporomandibular Joint

Q.—Is it possible to inflict significant trauma to the temporomandibular joint during routine extractions?

A.—Yes. During the forceps delivery of mandibular teeth the jaw should be stabilized with the other hand and the forces of extraction carefully controlled. When teeth are sectioned with chisel and mallet, a bite-block held firmly between the posterior teeth on the opposite side will stabilize the mandible and reduce trauma to the joint.

■ Methods of Controlling Post-Extraction Hemorrhage

Q.—What is the most effective means for control of post extraction hemorrhage?

A.—The following outline of procedure is efficient in most cases:

1. Reduce the patient's anxiety and pain with barbiturates and anodynes (1½ grains of pentobarbital and ½ grain codeine to adult).
2. Clean out the mouth completely for clear vision of the bleeding site.
3. If bleeding is moderate, apply pressure over the site by having the patient close firmly on a gauze sponge roll for 15 minutes.
4. When bleeding persists, anesthetize the area with a local anesthetic before investigating the tissues for the bleeding source.
5. Locate the source of bleeding and stop it. Rely on suction to keep the field clear and 1:100 epinephrine pack to reduce capillary ooze. If sutures obstruct vision remove them. Stop spurting vessels in bone by burnishing the cancellous bone over the bleeding point with a blunt instrument. Larger vessels in soft tissues may be clamped off with the points of a small hemostat. Carefully placed sutures will often stop soft tissue bleeding from flaps. If persistent bleeding from a socket requires packing, add topical thrombin to dampen a small cone of Gelfoam and place it in the socket, backing it up with pressure on a gauze sponge.

■ Atlas of Human Anatomy for the Artist. Stephen Rogers Peck. First edition. 272 pages with 1,000 illustrations. Index. Price $6. New York: Oxford University Press, 1951.

Of the several books which have appeared in recent years on anatomy for the artist this is easily one of the best. The author states in the preface that "this is a manual for the student [artist] who feels the need of exploring and memorizing human anatomy." In the opinion of this reviewer the Atlas is much more than this implies. Actually it covers the form and architectonic structure of the human body in a fashion which makes it a valuable reference work for the medical student and professional anatomist as well as the artist concerned with depicting the figure.

The Atlas is divided into seven main sections: Bones, Muscles, Surface Anatomy, Proportion, Equilibrium and Locomotion, Distinctions of Age, Sex and Race and Agents of Expression. The section on muscles contains a series of regionally arranged tables which give the origin, insertion, action and name derivation of each muscle. Other tables in the book cover racial characteristics, terminology and pronunciation of anatomical terms. The text which occupies only about 65 of the total pages is concise and clearly written. It is introduced only where word description is needed to supplement and reinforce the illustrations.

The atlas form being primarily a pictorial presentation of the subject must be judged by the quality of its illustrations. This volume can be given a high rating in this respect. The drawings, reproduced in line and half tone, were done by the author who is excellently qualified for the job. They are anatomically sound and have high artistic value. Thirty-two of the plates are photographic, mostly posed male and female figures placed in juxtaposition to drawings showing flayed figures in same pose.

One might wish that some of the half-tone illustrations were not quite so black. This however is a minor criticism of a book which is otherwise so excellent.—*T. S. Jones.*

■ The Temporomandibular Joint. Edited by Bernard G. Sarnat and Edward J. Ryan. Contributing authors: Allan G. Brodie, Harry Sicher, John R. Thompson, Joseph P. Weinmann and Arnold A. Zimmerman. 165 pages with 62 illustrations. Price $4.75. Springfield, Ill.: Charles C Thomas, 1951.

The material presented in this book was offered through the postgraduate division of the University of Illinois College of Dentistry during April and May of 1949. Thus, the monograph represents the combined efforts of many individuals who have given considerable time and effort to make detailed studies of the temporomandibular joint and related structures.

Derangements of the joint arise from varied factors; to make a correct diagnosis we must depend on an understanding of the normal structure and function as well as the pathologic physiology of the masticatory system.

The first chapter, by Sicher, deals with the functional anatomy of the joint presented clearly, with excellent illustrations. The second chapter, by Weinmann and Sicher, adds character to the first by discussing the histopathology of the joint. Allan Brodie discusses the contribution of the mandibular condyle to the growth of the face and Weinmann and Sicher cover pathology of the joint.

Chapter five, in which Zimmerman evaluates Costen's syndrome, is an especially interest-

ing presentation. Costen's syndrome is repeatedly referred to in the literature even today, when we know various symptoms he described and attributed to the joint could not be true. The fallacy of this concept is ably demonstrated by Zimmerman in his evaluation of the syndrome.

The final two chapters by Brodie and Thompson respectively deal with diagnosis and treatment.

Surgical disorders are not dealt with and the discussion is directed more toward functional derangements due to malocclusion; however, it was pointed out in the preface that the monograph was not intended as a complete review but rather as a basis for critical evaluation and further study. It is fortunate that some of the older concepts have been pointed out and shown to be fallacies rather than accepted at face value. The text is a valuable addition to the modern dental library.—*L. F. Aseltine.*

■ BEGIN NOW—TO ENJOY TOMORROW. Ray Giles. Second edition. 57 pages with illustrations. Published as a public service by Mutual Benefit Life Insurance Co., Newark, N. J., 1951.

Today's complicated economic conditions, coupled with dentists' non-participation in the Social Security program under prevailing laws, make the subject of planning for later years an important one for dentists. This book discusses types of retirement income provided by life insurance, annuities, or by some other plan of saving.

The thesis of this book is the assurance that happy, rewarding years can result from careful planning. The author first asks, "What are you doing, right now, to make sure you'll be happy, active and useful as long as you live?" Then follow constructive suggestions for planned retirement, summarized in seven general rules which, in this reviewer's opinion, are basically sound.

These rules state that one should begin financial preparation early, make useful and interesting activity the cornerstone of your plan, continuously widen your horizon, be socially useful, obey now the rules for healthful living, observe the rules of mental hygiene and discuss retirement with your work associates, your friends and your wife, to improve the quality of your planning. The best of all rules for a happy and successful retirement seems to be "Retire To—Not From." Questions to check are concerned with interesting hobbies and activities for spare time, which might help the community or the world at large. The final chapters are concerned with economic cycles and contain a splendid retirement time table.

This reviewer feels that Mr. Giles has written a book in which the dentist will find an honest approach to many of his economic and social problems.—*Lloyd H. Dodd.*

■ A DOCTOR'S PILGRIMAGE. Edmund A. Brasset, M.D. 256 pages. Price $3.50. Philadelphia: J. B. Lippincott Co., 1951.

City-bred and city-practicing doctors will read this saga of rough-and-tumble medical practice with shocked surprise, but there is much more than that described in this running account of a fledgling doctor's efforts to get started and the discouraging obstacles he overcame.

The author writes in a quietly humorous style that serves to lighten the grimness of many of his experiences and his desperate attempts to level the mountain of debt that overshadowed him so long but which was finally removed. Every professional worker will understand why, after finally attaining many years later a neurosurgical goal that had been his aim since interne days, the author voluntarily, even eagerly, gave this up and returned happily to his small town practice.—*W. W. Bolton.*

■ THE 1951 YEAR BOOK OF DENTISTRY. Edited by Stanley D. Tylman, Donald A. Keys, John W. Knutson, George R. Moore, Hamilton B. G. Robinson and Carl Waldron. 512 pages with 347 illustrations. Index. Price $5. Chicago: The Year Book Publishers, Inc., 1951.

The current edition of the Year Book of Dentistry is similar to previous volumes in size and

manner of presentation. It affords a digest of material selected from periodical dental literature which has appeared in the United States and in many foreign publications from August 1950 to August 1951.

There are eight principal divisions contained in the current edition: diagnosis, pulpal and periodontal diseases and related pathology, caries, surgery and related pathology, public health, restorative and prosthetic dentistry, orthodontics, and dentistry for children. Each main division is then divided into several sections. Selections dealing with the various specialties are drawn from journals dedicated to such special subjects, as well as from more general publications.

The panel of editors, the same as that for the 1950 volume, is made up of men of extensive training and long experience in their special fields.

The book is easily handled, with adequate print and illustrations. It is a good, quick reference book, which supplies in brief form the current published opinion on some of dentistry's most important phases.—*Martha Ann Mann.*

■ From a Doctor's Heart. Eugene F. Snyder, M.D. 251 pages, 16 illustrations. Index. Price $3.75. New York: Philosophical Library, 1951.

This story begins with the first coronary occlusion of a physician-philosopher, and takes place during the period of convalescence in a hospital which follows. It is composed primarily of a series of bedside discussions between the author, his physician wife, and their intelligent and inquisitive teen-age son on the subjects of heart disease and medicine in general. Interspersed among their conversations are the meditations of the author on the diverse subjects of life and death, the art of medicine, politics, and religion, along with well-chosen anecdotes to illustrate his philosophy.

The technical information relating to heart disease, and particularly its psychosomatic elements, is accurate and well presented. This information alone would justify the publication and wide reading of this work even without the spiritually inspiring portions dealing with the author's philosophy which makes the book such pleasant reading. The illustrations by R. V. Tribe, a cartoonist, are well done and amusing.

In addition to the great value the book would have for patients with heart disease, every professional or business worker who is under pressure should read it in the interests of self-preservation and should relearn the lessons on the prophylaxis of coronary heart disease.—*Mary R. Richards.*

■ Modern Drug Encyclopedia and Therapeutic Index. Marion E. Howard. Fourth edition. 1431 pages. Therapeutic, Generic Name, Manufacturers' and Distributors', and General Indexes. Price $12. New York, Drug Publications, Inc., 1952.

The new edition of this reference book includes descriptions of a great many drugs introduced since 1949. As in past editions, these concise descriptions are based upon information furnished by the manufacturer, but an attempt is made to exclude unreasonable claims and to check the material against standard texts or original sources. The drugs are listed alphabetically by their proprietary names and have cross-references in the several excellent indexes. The new Generic Name Index is intended to show at a glance the names of all therapeutic agents listed by the Council on Pharmacy and Chemistry of the American Medical Association in *New and Nonofficial Remedies.*

The Encyclopedia is not to be regarded as a critical authoritative compendium; but it is valuable, within the foregoing limitations, as an up-to-date source of unofficial information concerning new products that may or may not be listed in the standard volumes such as the *U. S. Pharmacopeia, National Formulary, U. S. Dispensatory, New and Nonofficial Remedies* and *Accepted Dental Remedies.*

The dental practitioner may occasionally desire to refer to this book, but he should clearly understand that not all of the products listed are of established value in therapeutics.—*Sholom Pearlman.*

■ EXPLORACION CLINICA EN ESTOMOTOLOGIA Y SU INTERPRETACION (CLINICAL EXAMINATION IN DENTISTRY AND ITS INTERPRETATION). I. Saenz de la Calzada. 486 pages with 372 illustrations, 10 in color. Index. Price 230 pesetas. Madrid, Spain: Editorial Paz Montalvo, 1951.

This book was needed to fill a void in the Spanish dental literature. As indicated in the title, the book is devoted entirely to the various methods employed in clinical examinations for the purpose of arriving at a satisfactory diagnosis. Most of the modern instruments and methods available today are described.

While the author does not delve into detailed descriptions of the various pathologic conditions, he considers them objectively.

The book is well written, the explanations are lucid and it is easily read. The author has chosen, organized and presented his material well, in logical sequence. In addition, the type is easy to read and the paper is an exceptionally fine enameled stock; by and large, the illustrations are well reproduced. There is an excellent table of contents and an index well organized and arranged for quick reference. Each of the fourteen chapters is preceded by a brief outline of its contents and at the end of each the author evaluates the various methods employed.

The chapters include the general examination of the patient, the teeth, the periodontal and gingival tissues; also the cheek, tongue, and the floor and roof of the oral cavity.

Consideration is also given to the examination of the various fluids of the oral and oral-pharyngeal cavities.

In chapter eight, the author discusses the accidental and pathologic fractures of the bones of the head in addition to the various temporomandibular joint disorders. Methods for the examination of the maxillary sinuses and other facial and nasal cavities are likewise considered. The technics and interpretations of intraoral and extraoral roentgenography as well as laminography are discussed. Chapters 12 and 13 present a thorough over-all presentation of examinations involving the cardiovascular system, the lungs and other internal organs.

The various tests employed in the laboratory for the purposes of urine analysis, basal metabolism determination and the histopathologic examinations are also given.

All in all, it is a book that should be well received by Spanish reading dentists.—*Stanley D. Tylman.*

■ BIBLIOGRAPHY OF MEDICAL EX LIBRIS LITERATURE. Samuel X. Radbill, M.D. 40 pages and 16 plates. Price $4.50. Los Angeles: Hilprand Press, 1951.

This fine contribution to the literature of bookplate collecting is perhaps the first bibliography of a specialized interest in the *ex libris* field. The author is widely recognized as an authority on medical bookplates and his book will undoubtedly stimulate veteran collectors and recruit others among physicians, dentists and pharmacists. The medical *ex libris* is an interesting medium for the picturization of the healing arts historically and symbolically. Many physicians have designed their own *ex libris*, and the Art Exhibits at recent AMA meetings have included a number of interesting *ipse fecit* plates.

Dr. Radbill's book contains a listing of the published contributions to the literature on medical *ex libris*. Although the literature on dental *ex libris* is sparse, the author includes five dental references, all of them European. The bibliographical notes are informative and provocative and should serve as an effective source of guidance to the collector. The volume will prove valuable to dentists who are already ex-librists and to those of the profession who are seeking a good hobby associated with the field of graphic arts.

The 16 plates—would that there were many more—form a carefully selected representation of the medical bookplate. They include designs by Henri Andre and Arthur W. Clark and the *ex libris* of such collectors as Emanuel Bergman, Herman T. Radin, and Edwin S. Potter. The designs illustrate the use of various devices—mottoes, macabre motifs, serpent emblems, allegorical figures and heraldic elements—characteristic of the bookplates of physicians. —*Gardner P. H. Foley.*

■ Trigeminal Neuralgia and Arterial Hypertension. G. Doring and R. Magun. Deutsche Ztschr. f. Nervenh. 166:196, 1951.

The examination of 118 patients with trigeminal neuralgia revealed that they had hypertension. The arterial hypertension was the basic disease although neuralgic paresthesia (Bernhardt's paresthesia) also was observed in a high percentage of patients with hypertension. The basic hypertensive process produces tissue changes in the gasserian ganglion that in turn cause the neuralgia. The tissue changes, however, may be produced by other disorders also. Trigeminal neuralgia is not a vasoneurosis or a vasomotor crisis. Physiologically it can be regarded as a "short circuit" between the transmission of pressure and pain perceptions. Clinical observations do not justify the concept that vascular spasms are responsible for the typical pain attack. The anatomic cause of the "short circuit" is probably located in the gasserian ganglion; more particularly it is believed that the hypertrophy of the covering syncytium with increase in the basketlike bundles and proliferation of the amphicytes might explain the interruption.—*J. K. Paul.*

■ Fibrous Dysplasia of Facial Bones and Paranasal Sinuses. Hans Brunner. Arch. Otolaryng. 55:1, January, 1951.

Though fibrous dysplasia is a rare disease of the facial bones, on a number of occasions it has been reported as occurring in the mandible and maxilla. When there is extensive involvement in the maxilla, the antrum and possibly other paranasal sinuses usually are involved with the result that the situation is greatly complicated. A number of such cases have been observed.

In a case of fibrous dysplasia the sinuses may become involved when one or more of the surrounding bones is primarily affected. Several authors emphasize the tendency of the disease to affect the membranous bones of the face. In fibrous dysplasia of the maxillary, sphenoid, ethmoid or frontal bones there is deposition of dense sclerotic bone and the sinuses may become entirely filled with newly formed tissue.

One case of fibrous dysplasia of the maxillary bone is of particular interest to the oral surgeon. The patient reported with paresthesia of the left cheek and proptosis of the left eye; the skin of the inner angle of the left eye and that below it was red and swollen. The left eye was slightly more edematous than the right. The mucosa of the turbinates also was edematous. There was no diastema of the teeth; only the molars were missing on both sides. Roentgenograms showed dense clouding of the left frontal sinus, the bony margins of which were sclerotic and eburnated. The left ethmoid sinus was densely cloudy and both antra were clouded with the air space on the left entirely obliterated. During the operation, it was found that the entire left maxillary sinus was filled with cancellous, hyperemic bone, which had fused with the compact bone of the anterior, medial, lateral and inferior walls of the sinus.

Microscopic examination showed cancellous bone with cortical remnants covered by a thickened periosteum. The bone trabeculae consisted of woven bone; there were no mosaic structures. The margins of the trabeculae were aplastic. Between the trabeculae there was firm or loose connective tissue as well as chronic, inflammatory tissue which, however, exerted no influence on the bone.

After the operation, during which a piece of newly formed bone was removed, there was rapid replacement with new bone. This re-

placement, apparently typical of the disease, is of interest because, in general, the growth potential of the newly formed tissue in fibrous dysplasia is supposed to be low.—*Bruce L. Douglas.*

■ SUPERVISED EMERGENCE OF THE ANESTHETIZED PATIENT. C. D. Anderson. Anesthesiology 12:604, September, 1951.

One of the most neglected periods of a general anesthetic experience is that of postanesthetic recovery. Frequently because of pressure of succeeding cases or for some other reason, the supervision of the patient's emergence is delegated to an untrained individual.

In order to assure the greatest safety during the recovery period, the following precautions should be taken by the nurse or assistant: there must be a freely patent airway with all secretions or vomitus carefully removed; adequate oxygenation should be instituted if the patient shows any signs of hypoxia, of which progressive symptoms are tachycardia, restlessness, some degree of air hunger and, finally, cyanosis; pain or discomfort should be eliminated if possible; hemorrhage must be controlled—in hospitalized cases of excessive loss of blood fluid therapy may be of great value; and every effort should be made to protect the patient from physical injury.

The nurse or assistant should be properly trained to handle the emergence period and the recovery room should be well equipped to handle any unexpected contingency. The unit should be supplied with oxygen and suction apparatus, sterile intravenous sets with emergency drugs including analeptics, vasoconstrictors and narcotics.—*Bruce L. Douglas.*

■ EMERGENCY TRACHEOTOMY IN POST-TRAUMATIC RESPIRATORY OBSTRUCTION. S. F. Kelley. Plast. & Reconstruct. Surg. 8:275, October, 1951.

Tracheotomy is an emergency operation whereby an opening is made into the trachea enabling the patient to breathe through his neck when obstruction above prevents him from breathing through his mouth. The emergency procedure is demanded when the patient is cyanotic, gasping and struggling for air or when his face has a greyish pallor and asphyxiation is imminent. The operation is performed with the patient lying on his back, his shoulders raised, his head lowered and held in a straight line with his body. The operator holds a knife in the right hand (the more tracheotomy instruments available the better), grasps the Adam's apple and trachea securely with the thumb, middle and ring fingers of the left hand, pressing aside the dangerous vessels, and exactly in the midline from the thyroid notch above almost to the suprasternal notch below, makes a long incision deep enough to reach the trachea. Since the trachea cannot be seen in the wound on account of the presence of blood, the operator must pass the free index finger of the left hand down from the Adam's apple over the rings of the trachea. He moves the index finger a little to the left and exactly in the midline incises the second, third and fourth rings of the trachea, taking care to avoid injury to the first ring of the trachea which would result in the formation of granulations, stenosis and permanent obstruction. A Trousseau dilator is inserted to spread open the trachea until a proper cannula is provided. If a dilator is not at hand, a hemostat, a split wooden tongue blade or any narrow thin flat object may be employed depending on the resourcefulness of the operator. With the head still lowered, the patient is turned on his side to prevent the flow of blood from obstructing the airway. Since sedatives depress the respiratory center, reduce the cough reflex and produce dry obstructive secretions, they should never be administered before or after tracheotomy.—*Herbert J. Bloom.*

■ PARATHYROID ADENOMA. C. C. Blackwell. Am. J. Surg. 82:439, October, 1951.

Early recognition of hyperparathyroidism is essential if serious renal and skeletal complications are to be prevented. If the disease remains unrecognized, renal insufficiency progresses and may become irreversible. Increased excretion of calcium and phosphorus usually

results in symptoms of polyuria and polydipsia, and the danger of the formation of urinary calculi is ever present.

Generalized osteitis fibrosa cystica is found in approximately 40 per cent of the cases. The bone disease is the result of increased absorption rather than decreased formation of bone. It occurs most commonly in the form of cysts and tumors of variable size superimposed on generalized skeletal decalcification. The osteoclastoma or benign giant cell tumor may be the first sign of a developing hyperparathyroidism. All types of bone deformities may be encountered including spontaneous fractures and bending of the long bones.

In establishing the diagnosis of the disease, the symptoms and findings should be borne in mind. Special blood chemistry studies including calcium, phosphorus and alkaline phosphatase determinations are always indicated.

This is one more of the many systemic diseases which the observant oral surgeon may discover before advanced stages develop.—*Bruce L. Douglas.*

■ Treatment of Bilateral Fractures of the Edentulous Mandible. J. B. Erich. Plast. & Reconstruct. Surg. 9:33, January, 1952.

The difficulties which sometimes arise in the care of edentulous patients with bilateral fractures of the mandible are well known to all surgeons who treat maxillofacial injuries. If the injured person is without usable dentures and if the bony fragments are badly displaced, one must resort to open operations or to external pin fixation.

When the surgeon is fortunate enough to have the patient's upper and lower dentures available for use, the following technic may be used. If the lines of fracture are situated anterior to the first molar region, the problem of therapeutic management is simple. The fragments can be forced into proper position by manipulation while immobilization is effected by means of the lower denture, which acts as a splint: it is attached to three lower fragments of the mandible by circumferential wires which are passed around the bony segments and over the denture. It is advisable to employ at least two circumferential wires around the middle fragment and one around each posterior fragment. These wires should be spaced in such a manner that none of them is located nearer than 1 cm. to a line of fracture. Fixation of the fragments by this method permits the patient to masticate soft foods. Furthermore, this form of immobilization is not attended by any complications, providing that bronze, stainless steel or tantalum wire is employed. Fixation should be maintained for four or five weeks.

This form of therapy is useless when the fractures are situated in or distal to the first molar region because the posterior fragments are too short to retain circumferential wires. Consequently, the treatment becomes considerably more complicated. Briefly, the technic in such cases involves the application of a plaster head cap to which wires can be attached for holding the patient's upper denture in proper position in the mouth. By means of circumferential wires, the lower denture is attached to the middle fragment of the mandible. Hooked arch bars are applied to the teeth of the upper and lower dentures, and intermaxillary elastic (rubber band) traction brings the lower denture and the middle fragment of the mandible up into normal relationship with the upper denture and the maxilla respectively. Oddly enough when the middle fragment of the lower jaw is returned to its normal position, the two posterior fragments assume a fairly normal relationship to the middle fragment and are no longer markedly displaced by muscle traction. The posterior fragments require no fixation and the fractures heal very satisfactorily.—*J. K. Paul.*

■ Pigmented Hairy Tongue Accompanying Antibiotherapy. Hal E. Freeman. Arch. Dermat. &Syph. 65:99, January, 1952.

Woods and associates and others have called attention to "monilial infections complicating the therapeutic use of antibiotics." As yet there is no definite information as to the probable causation of the pigment in black and brown hairy tongue cases. A patient with an apparently normal tongue was given penicillin by intramuscular injection. Two days later because

of a "cold" she began taking an iron-containing patent medicine (Hadacol). She reported that her tongue "turned brown and then black" after the use of this patent medicine was begun. The author, wondering if iron in the medication caused the pigmentation, gave himself 300,000 units of penicillin intramuscularly while his own tongue was apparently normal. It became covered with *Candida albicans*. Then he took some samples of an iron-containing antianemic tablet. Overnight his tongue became covered with brown-to-black pigment in the coating. The condition would have been clinically indistinguishable from "black hairy tongue." The author observed this in himself and in several patients repeatedly. It is apparent that in a comparatively few cases iron causes pigment to appear in a hairy tongue. It is quite possible that other metals may have the same effect. Further study seems desirable. The observation that antibiotics allow candida (monilia) to grow luxuriantly has been made repeatedly. The reason for the brown or black color is the presence of iron in large amounts taken in the diet or as medication. This phenomenon has been observed to follow the use of aureomycin and terramycin; but no opportunity has been afforded to observe whether or not it follows the use of streptomycin, neomycin, tyrothricin, bacitracin or chloramphenicol.—*Myron Kaufman.*

■ General Anesthesia for Dental Surgery. R. P. Bergner and R. M. Herd. Postgrad. Med. 11:26, January, 1952.

The extraction of a diseased tooth does not warrant the use of anesthetic technics that may produce even subclinical damage to the nervous or to the cardiovascular system. The anesthetist must always remember that few patients will die from an oral condition and that "pushing" an anesthetic agent or continuing an anesthetic when the patient is reacting unfavorably is inexcusable, dangerous and unnecessary. General anesthesia for dental surgery need not involve the use of hypoxic mixtures. Technics are available for both office and hospital practice which allow the use of at least 20 per cent oxygen.—*J. K. Paul.*

■ Lipoma of the Tongue. W. A. Coakley; R. N. Shapiro, and Nils Nordstrom. Plast. & Reconstruct. Surg. 9:55, January, 1952.

Lipomas, tumors composed of adult fat cells, are found with relative frequency in regions which normally have an abundance of adipose tissue. Lipoma of the tongue, however, is rarely seen even in clinics where oral neoplasms are frequently observed. The incidence is approximately 0.3 per cent of all neoplasms of the tongue and only 1 per cent of the benign neoplasms of that organ. Lipomas of the tongue lie immediately under the mucous membrane; the yellow color may show through the thin mucosa. The tumors are movable and may have a semifluctuant or lobulated feel on palpation. These tumors seldom ulcerate, usually appear in middle or later life and grow very slowly.—*J. K. Paul.*

■ Atypical Facial Neuralgia in the Hypothyroid State. F. B. Watts. Ann. Int. Med. 35:186, July, 1951.

Twenty-nine cases are presented illustrating a common clinical syndrome which is often overlooked; namely, atypical pain about the face and neck frequently associated with the hypothyroid state. The type and intensity of the pain vary considerably, and may be manifested as a dull aching or throbbing pain in either carotid area, in or about the ear, in the frontal or temporal area, or along the upper or lower jaw or the posterior cervical area. The pain may be quite intense (not as intense as trigeminal neuralgia) or merely a dull ache, but it is annoying because of its chronicity. When a patient complains of this type of facial pain, has recurrent and at times persistent headaches, is subject to fatigue and insomnia and is inclined to be sensitive to cold, the existence of the hypothyroid state is likely. The diagnosis thus is suggested by the above history and is substantiated by determination of the basal metabolic rate, as well as by exclusion of other disease by roentgenographic study of the teeth and sinuses. Response to thyroid extract generally is favorable in two weeks.—*J. K. Paul.*

■ Meniscectomy for Internal Derangement of Temporomandibular Joint. C. L. Kiehn. Am. J. Surg. 83:364, March, 1952.

Meniscectomy has a definite place in the treatment of dysfunction of the temporomandibular joint. This has been shown in 15 cases by the complete relief of chronic symptoms and the return of the normal function of the mandible. Since the diagnosis is based entirely on signs and symptoms, operation is contraindicated in the acute cases except those of acute dislocation and of rupture of the meniscus.

Treatment for the more acute cases should include sedatives and heat applications; the joint should be put at rest for a period of time. If malocclusion is determined as the cause, it should be corrected and the jaws should be immobilized for one month with interdental fixation. If crepitus and pain persist after this time, a meniscectomy should be done. The indications for operation are pain which has been present for a long period of time, locking, dislocation, limitation of motion and inability to chew solid foods. Roentgenograms of the joint are not diagnostic.—*J. K. Paul.*

■ The Pigmented Nevus. W. K. Jennings. Gen. Pract. 5:34, March, 1952.

The importance of malignant melanoma is universally recognized, but the ability to differentiate the malignant from the benign mole and the knowledge of the surgical principles which should underlie their treatment are qualifications possessed by few. For the sake of simplicity, the terminology is modified to include the concept of Adair and of Pack that all melanomas should be considered malignant together with that of Sachs that all junctional nevi possess malignant potential.

Pigmented moles should be regarded with suspicion under three conditions: (1) when the lesion is found in a location uncommon to ordinary moles (sole of foot, eye, vulva, beneath a fingernail), (2) when a mole undergoes any sort of change (color, growth, ulceration), (3) when it is located in a region which makes it susceptible to irritation (collar and belt lines, foot, bearded area of the face). Under any of the above circumstances the lesion should be excised. The common practice of destroying nevi by electrocoagulation or with the actual cautery should be condemned. There is evidence that such treatment may disperse live melanotic cells some distance from the site of the primary lesion. It is not sufficient to state that all suspicious nevi should be excised, for improper surgical removal can be just as dangerous as destruction with the cautery.

In addition to excision of the skin surrounding the mole, it is important also to carry the incision down through the underlying fascia to include a fascial strip corresponding in size to that of the excised skin since invasion of the deep dermal and fascial lymphatics is one of the common manners of spreading. A simple and comparatively safe technic for excising these lesions is as follows: (1) two silk traction sutures, one at each end of the mole, are placed approximately 2 cm. beyond its periphery; (2) the line of excision is then made safely beyond the traction sutures and at a corresponding distance from the sides of the mole; (3) the incision is carried down through the underlying fascia, and the encompassed tissue is removed en bloc. Frequently it is necessary to use a split or full thickness skin graft in order to effect primary closure.—*J. K. Paul.*

■ Aureomycin Treatment of Recurrent Oral Aphthae. O. Gottlieb. Ugesk. f. laeger 113:1540, November, 1951.

Oral aphthae are due to activation of a latent virus infection. Fourteen cases of long standing with free intervals of a month at the most, which had been refractory to earlier treatment, were given aureomycin locally, mainly as a mouth wash. The result was good in 8 of the 11 cases of Mikulicz's solitary recurrent aphthae; improvement occurred in 2 cases of Sutton's aphthae and 1 case did not respond to the treatment. In 2 cases of multiple recurrent aphthae the treatment had no effect.—*J. K. Paul.*

Announcements

■ Oral Pathology Board Announces Examination

The American Board of Oral Pathology will conduct its next certification examination September 7 in St. Louis. Applicants who wish to have their credentials evaluated in anticipation of appearing before the examining committee are requested to write promptly to Col. Joseph L. Bernier, secretary, American Board of Oral Pathology, Armed Forces Institute of Pathology, Seventh Street and Independence Avenue, S.W., Washington, D. C.

Application blanks may also be procured from Colonel Bernier's office.

■ Great Lakes Society of Oral Surgeons to Meet in Cleveland

The Great Lakes Society of Oral Surgeons, composed of members in Ohio, Michigan and Western Pennsylvania, will meet September 21, 1952, from 9 A.M. until 4 P.M., at the Statler Hotel, Cleveland.

■ American College of Dentists to Convene

The convocation of the American College of Dentists will be held September 7, in the Statler Hotel, St. Louis. The meeting will consist of morning, afternoon and evening sessions, and a luncheon. Further information may be obtained from Otto W. Brandhorst, secretary, 4952 Maryland Avenue, St. Louis 8.

■ Ninety-third Annual Session of the American Dental Association

The American Dental Association will hold its ninety-third annual meeting in St. Louis, September 8-11, 1952. Scientific sessions will include a general meeting of all sections to discuss antibiotics in dentistry and the foci of infection theory.

The Association's Board of Trustees and House of Delegates will convene for official business meetings and elections. The Association anticipates an attendance of 15,000 dentists.

■ Postgraduate Training at New York University College of Dentistry

The periodontia department of New York University College of Dentistry announces its full-time course in periodontia and oral medicine for one academic year, September 22, 1952, to May 22, 1953, leading to a certificate. The course is limited to four.

For further information write Postgraduate Division, New York University College of Dentistry, 209 East Twenty-third Street, New York 10.

■ American Board of Oral Surgery to Hold Examinations

Examinations for certification by the American Board of Oral Surgery will be held October 5, 6, 7 and 8 at the Jung Hotel, New Orleans.

Further information may be obtained by writing to the Board's secretary, Leslie M. FitzGerald, 718 Roshek Building, Dubuque, Iowa.

■ American Society of Oral Surgeons Releases List of Recognized Regional Societies of Oral Surgery

The American Society of Oral Surgeons herewith publishes a list of recognized regional societies composed of specialists in oral surgery. Members of these societies limit their practice to this specialty and are fully qualified to practice oral surgery.

The following are the societies arranged according to the date of their founding:

Southern California Society of Oral Surgeons (organized 1921)
J. Lorenz Jones, secretary-treasurer, 405 North Bedford Drive, Beverly Hills, Calif.

Chalmers J. Lyons Academy of Oral Surgery (organized 1927)
Bruce B. Cook, secretary-treasurer, 10314 Puritan Avenue, Detroit

Southwest Society of Oral Surgery (organized 1929)
Robert C. Botts, secretary-treasurer, 912 Medical Arts Building, Fort Worth, Texas

Northern California Society of Oral Surgeons (organized 1930 and reorganized 1945)
B. C. Kingsbury, Jr., secretary-treasurer, 601 Georgia Street, Vallejo, Calif.

The Chicago Society of Oral Surgeons (organized 1936)
V. B. Sorensen, secretary-treasurer, 4013 North Milwaukee Avenue, Chicago

The Cleveland Society of Oral Surgeons (organized 1946)
Eugene V. Linsey, secretary-treasurer, 736 Rose Building, Cleveland

The New England Society of Oral Surgeons (organized 1947)
John E. McNally, treasurer, 293 Bridge Street, Springfield, Mass.

Western Pennsylvania Society of Oral Surgeons (organized 1948)
Donald E. Wagner, secretary-treasurer, 703 Peoples East End Building, Pittsburgh

Southeastern Society of Oral Surgeons (organized 1949)
Charles F. Landis, secretary-treasurer, 316 James Building, Chattanooga, Tenn.

Metropolitan-New York Society of Oral Surgeons (organized 1949, incorporated 1950)
S. Daniel Seldin, secretary-treasurer, 57 West 57th Street, New York

Midwestern Society of Oral Surgeons (organized 1950)
Lester H. Jasper, secretary-treasurer, 508 North Grand Boulevard, St. Louis

Middle Atlantic Society of Oral Surgeons (organized 1951); The West Virginia Society of Oral Surgeons, organized 1949, dissolved in 1951 to become a section of this society.
Eugene D. Lyon, secretary-treasurer, 11 East Chase Street, Baltimore

Iowa Society of Oral Surgeons (organized 1951)
John Whinery, secretary, University Hospitals, Iowa City, Iowa

Indiana Society of Oral Surgeons (organized 1951)
J. Frank Hall, secretary-treasurer, 1121 West Michigan Street, Indianapolis

Great Lakes Society of Oral Surgeons (organized 1951)
B. B. Cook, secretary-treasurer, 10314 Puritan Avenue, Detroit

According to W. T. Ewing, president of the American Society of Oral Surgeons, the above list has been compiled by the Society "so that the dental public will not be misinformed in regard to the men who actually limit their practices to this specialty."

The thirty-fourth annual meeting of the American Society of Oral Surgeons will be held October 8-11 in New Orleans. Further information may be obtained from Miss Ruth F. Whalen, executive secretary, 1112 East Clay Street, Richmond 19, Va.

■ American Society for the Advancement of General Anesthesia in Dentistry to Hear Evaluation of Thiamylal Sodium

The value of thiamylal sodium and new muscle relaxants in dental anesthesia will be discussed by Peere C. Lund of Johnstown, Pa., at the fall meeting of the American Society for the Advancement of General Anesthesia in Dentistry, October 27, in New York. Dr. Lund, a physician, is a diplomate of the American Board of Anesthesiology and director of anesthesia at the Conemaugh Valley Memorial Hospital, Johnstown, Pa.

At the same meeting, M. Hillel Feldman, director of dental service at the Lincoln Hospital, New York, will discuss the use of inhalation anesthesia for the cardiac patient. Further information may be obtained by writing Dr. Feldman, who is secretary of the Society, at 730 Fifth Avenue, New York 19.

■ American Academy of Implant Dentures Organized

The American Academy of Implant Dentures was formed at the recent Chicago Midwinter Dental Meeting, "for the ethical promulgation of implant dentures."

The qualifications necessary for participation in the organization are as follows: membership in good standing of the American Dental Association (or if beyond the territorial limits of the United States, the applicant must be a member in good standing of a recognized dental society); and "a record of personal successful advancements in this field." Applicants may participate in the prosthetic, surgical or technical aspects of the field.

Further information may be obtained by writing to The American Academy of Implant Dentures, Office of the Secretary, Rochester, Minn.

■ New York Institute Announces October-May Courses

The New York Institute of Clinical Oral Pathology will conduct the following courses from October 1952 through May 1953:

Clinical Oral Pathology, 16 sessions, presented on two Wednesdays each month, 7:30-10 P.M.

Diagnostic and Surgical Technics, 8 sessions, given on one Wednesday a month, 7:30-10 P.M.

The courses are approved by the Veterans Administration and the education department of the University of the State of New York. Further information may be obtained by communicating with the Institute's executive secretary, 101 East 79th Street, New York 21.

■ University of Minnesota Announces Graduate Program

Graduate study programs of 2-3 years, leading to the degree of master of science are now being arranged by the University of Minnesota. A program may be arranged with a major in oral surgery, oral pathology, orthodontics, oral medicine, periodontics or restorative dentistry (operative, prosthetics, pedodontics or endodontics) and a minor in one of the fundamental health sciences.

An alternate program in the basic sciences, with special reference to dentistry, leads to the doctor of philosophy degree.

A limited number of fellowships and teaching assistantships are available to the graduate students. Stipends for these appointments range up to $3,600 per year. Further information and application forms may be obtained from the dean of the Graduate School, University of Minnesota, Minneapolis.

Editorial communications

■ ORIGINAL COMMUNICATIONS—This journal invites concise original contributions in the broad field of clinical and experimental surgery of the mouth and associated structures, including roentgenology, diagnosis, anesthesia and oral surgical pathology. Articles are accepted for publication with the understanding that they are contributed solely to the JOURNAL OF ORAL SURGERY. All manuscripts are subject to editorial modification. Neither the editors nor the publishers accept responsibility for the views and statements of authors expressed in their communications.

■ MANUSCRIPTS—Manuscripts submitted for publication should be sent to Frederick A. Henny, Editor, Henry Ford Hospital, Detroit, Michigan.

Manuscripts should be typewritten on one side of the paper only with double spacing and liberal margins. The author's name and the abbreviated title of the article should appear at the top of each manuscript page. The original should be sent to the editor and a carbon copy retained by the author. Manuscripts will not be returned if accepted for publication.

References should be placed at the end of the article and should conform to the style of the Quarterly Cumulative Index Medicus; viz., name of author, title of article and name of periodical with volume, pages, month and year. They should be numbered and should appear in the same order as that of the superior figures inserted in the appropriate positions in the text.

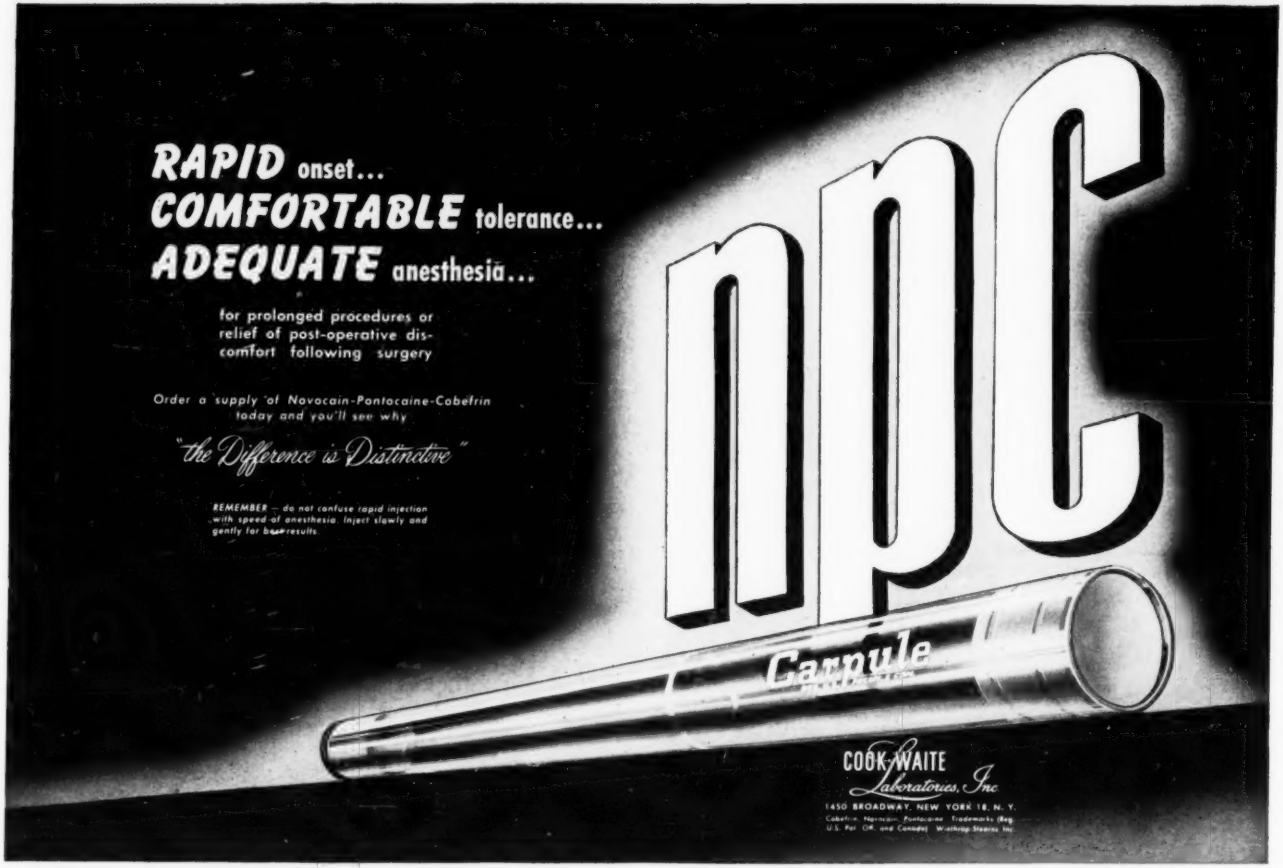
■ ILLUSTRATIONS—Illustrations accompanying manuscripts should be unmounted and numbered. The author's name should appear on the margin or back.

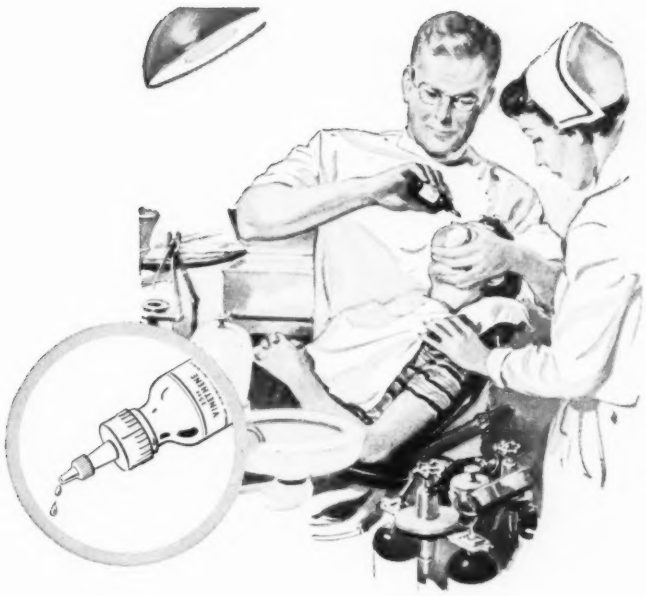
Authors should insert figure numbers at appropriate places in the text. The original drawings, or glossy print photographs of them, should accompany the manuscript. Legends for illustrations are to be typewritten in a separate list with numbers corresponding to those on the photographs and drawings.

A reasonable number of halftone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editors for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered in India ink or with black typewriter ribbon (carbon paper placed with carbon against back of sheet for bolder type). Ordinary blue or colors will not reproduce. Only good photographic prints or drawings should be supplied for halftone work.

■ CASE REPORTS—Case reports will constitute an important department of the journal and the editors welcome case reports that are of unusual clinical value or that present exceptional conditions of interest to dental surgeons.

■ EXCHANGES—Letters, exchanges, reprints and all other communications relating to the JOURNAL OF ORAL SURGERY should be sent to the American Dental Association, 222 East Superior Street, Chicago 11.


RAPID onset...
COMFORTABLE tolerance...
ADEQUATE anesthesia...
for prolonged procedures or relief of post-operative discomfort following surgery
Order a supply of Novocain-Pontocaine-Cabefrin today and you'll see why
"the Difference is Distinctive"
REMEMBER — do not confuse rapid injection with speed of anesthesia. Inject slowly and gently for best results.
npc
Carpule
COOK-WAITE Laboratories, Inc
1450 BROADWAY, NEW YORK 18, N. Y.
Cabefrin, Novocain, Pontocaine Trademarks (Reg. U.S. Pat. Off. and Canada) Winthrop Stearns Inc.



Anesthesia in Exodontia

As an anesthetic for operative procedures of short duration, VINETHENE offers exodontists four definite advantages:

1. It may be administered via the simple open-drop technic.

2. It minimizes emotional trauma by inducing anesthesia rapidly and blandly.

3. Recovery is prompt with a minimum of postextraction nausea.

4. It may be used in the gas machine to complement nitrous oxide-oxygen.

VINETHENE®

(Vinyl Ether for Anesthesia U.S.P. Merck)

AN INHALATION ANESTHETIC FOR SHORT OPERATIVE PROCEDURES

COUNCIL ACCEPTED

VINETHENE is a registered trade mark of Merck & Co., Inc.

MERCK & CO., INC.

Manufacturing Chemists

RAHWAY, NEW JERSEY

In Canada: MERCK & CO. Limited – Montreal

TREAT FRACTURES
the simple, easy way
Roger Anderson Equipment

Allows normal talking, eating and mouth cleanliness. Free catalog, technics, prices and reprints on request, without obligation.

THE TOWER COMPANY
P. O. BOX 3181 SEATTLE 14, WASH.

are you MOVING

Giving us advance notice will keep the Journal coming to you without interruption. Here's a handy form to use:

Name

Old Address

New Address

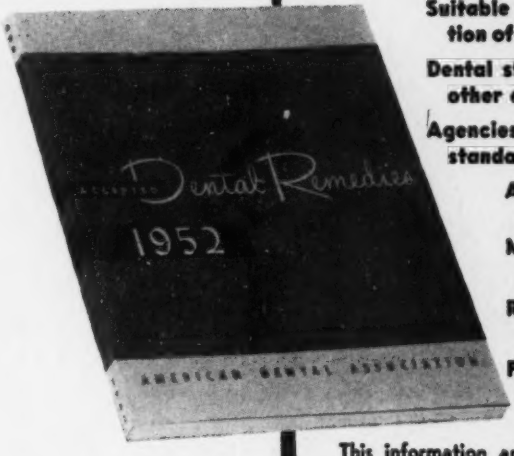
Mail to American Dental Association, 222 E. Superior St., Chicago 11, Illinois.

INDEX TO ADVERTISEMENTS

American Dental Association ..... A-3, 2nd Cover, 3rd Cover
Bristol Myers Co. ..... 4th Cover
Cook-Waite Laboratories A-1
Merck & Co., Inc. A-2
Tower Company, The A-3

THE 17TH EDITION . . .

ACCEPTED Dental Remedies



DO YOU KNOW:

Suitable conditions for disinfection of instruments?

Dental status of antibiotics and other anti-infectives?

Agencies responsible for drug standards?

Accepted commercial products?

Mechanics of prescription writing?

References to products not included in A.D.R.?

Provisions for acceptance of products?

This information appears in ACCEPTED DENTAL REMEDIES

Available NOW at only $1.50

ORDER DEPARTMENT, AMERICAN DENTAL ASSOCIATION
222 E. Superior St., Chicago 11, Illinois

Check the order you wish to place:

..... Place my name on the standing order list to get ACCEPTED DENTAL REMEDIES regularly each year beginning with the 1952 edition.

..... Just send me a copy of the 1952 book..... My check for $1.50 is enclosed.

Signed .....

Address .....

.....
City Zone State

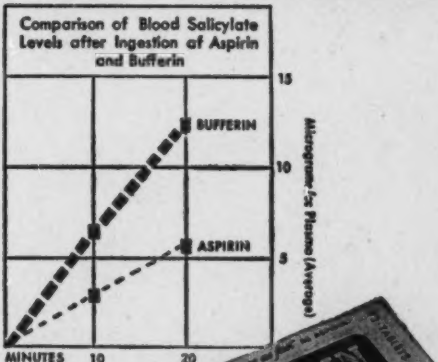
Doctor, I have a toothache!

When dental pain strikes, the patient thinks first of you. At midnight or 6 A.M., or in the midst of a busy day, your patient expects you to do something for her—immediately.

For *faster pain relief* recommend BUFFERIN, the antacid analgesic, which *acts twice as fast as aspirin.* Within 10 minutes after BUFFERIN is taken, the blood salicylate levels are higher than those attained by aspirin in twice this time.

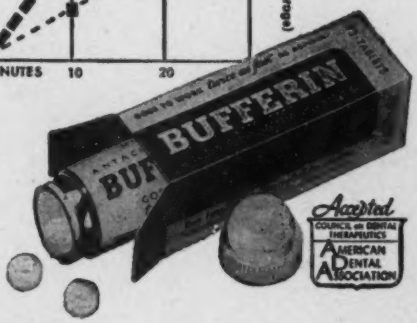
BUFFERIN is antacid, too. Whether given in small or large doses, BUFFERIN rarely produces gastric distress.

Use BUFFERIN before and after extractions and along with other therapy to minimize discomfort.



BUFFERIN

ACTS TWICE AS FAST AS ASPIRIN
DOES NOT UPSET THE STOMACH



BUFFERIN is a trade mark of the BRISTOL-MYERS CO., 19 W. 50 St., New York 20, N.Y.